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Organ of the Medical Association of South Africa

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Suid-Afrikaanse Tydskrif vir Geneeskunde

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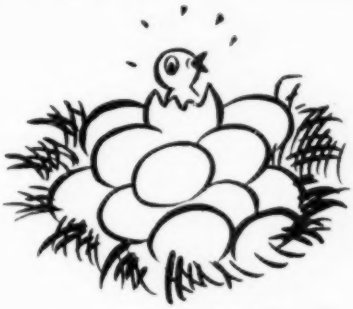

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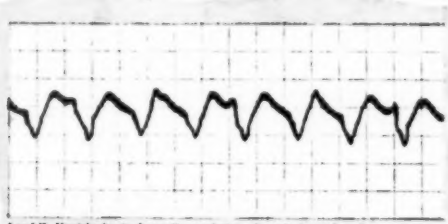

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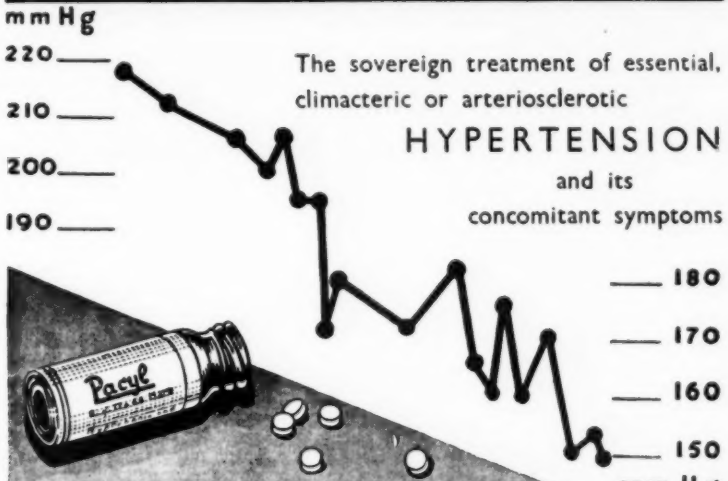

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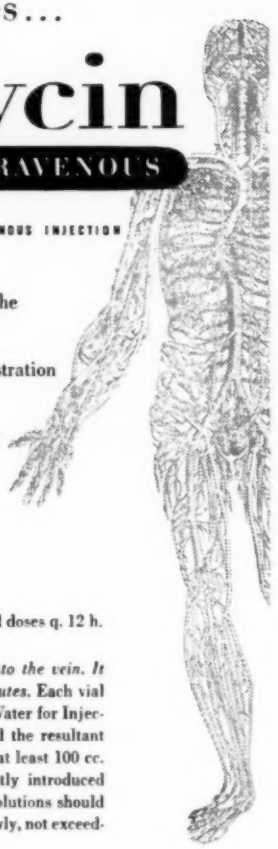

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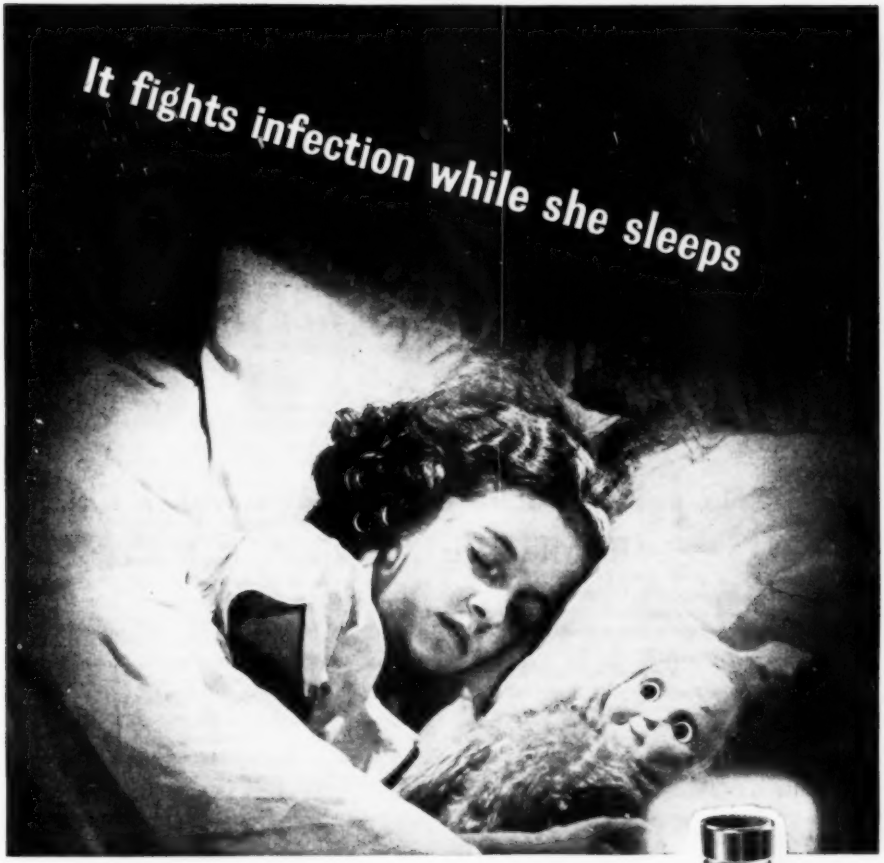

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INFERTILITY IN THE MALE*

I. DIAGNOSIS

P. J. M. Retief, M.B., Ch.M.
Cape Town

When one considers that at least one out of 10 marriages is childless, and that in about 30% of childless couples the fault lies with the male, it is apparent that male infertility is a very real entity. Another striking fact is that 10% of males referred for sterility are found to have a complete absence of spermatozoa (azoospermia) and, what is more, the overwhelming majority of males referred for study have no inkling of their disability, since they are physically and maritally normal. As the result of steady propaganda in latter years, two facts are generally known and universally accepted, viz. that the ability of the male to effect successful coitus in no way proves his fertility, and that no special investigation of the female partner in a childless marriage is warranted until the male partner has been carefully examined.

Under what circumstances should a man be referred for appraisal of fertility? In my view the couple should have been married and using no contraceptive means for at least twelve months before investigation is undertaken. Most usually the wife first approaches her practitioner. Before any special tests are done, the husband should be referred for examination. Then also where a woman has repeated miscarriages it is wise to have the semen examined. There is good evidence to support the view that abnormal spermatozoa can be a cause of abortions or misformed foetusses.[1]

The most important part of the examination of the male is that of the semen, but it is equally important to understand that infertility as established by this test is merely a sign or symptom.[2] It is the outward sign of a derangement in the genital tract the cause of which may be one of many. The diagnosis is only complete when the etiological factor has been pinned down or surmised. It is disappointing to have to admit our lack of exact knowledge regarding many of the factors which have as effect the symptom of male infertility. When one considers the profound influence the hormonal glands, in particular the pituitary gland, have on sex function, it is strange how seldom the pituitary gland can definitely be implicated as a cause of male infertility. This may of course be due to the inadequacy of the present tests and methods of examination. It is exceptional to find physical signs of endocrinological disorders among patients referred for an appraisal of fertility, and for practical purposes we must accept the fact that, although sterility often is found in endocrinological syndromes, endocrinological factors can but rarely be established in patients with the symptom of infertility.[3]

Examination of the male referred for appraisal of fertility should be done on the following broad lines.

HISTORY

Since many factors may have a bearing on the problem the inquiry must be extensive and thorough. Has the patient had any severe illnesses or periods of possible malnutrition? Has the patient had an operation in the genital area as for inguinal hernia, varicocele, hydrocele, etc.? Have the testicles ever been traumatized, sufficient for him to be off work or to be in bed? Has the patient had mumps during adulthood, or a urethral discharge, and were these infections complicated by orchitis? Has the patient been exposed to X-rays for treatment or as an occupational hazard? It is well also to get a brief description of the onset of puberty and the occurrence of secondary sexual characteristics. What is the nature of his libido, the frequency of intercourse, and at what time of the menstrual cycle does intercourse usually take place.

At this stage a few well-directed questions regarding the sex act will soon disclose if intercourse is properly conducted.

During the interview one notes the character of the voice.

GENERAL EXAMINATION

These patients are usually young, vigorous and healthy. Nevertheless the patient is carefully examined and all systems are checked over. I find it saves time to have the patient strip completely, and then one is unlikely to miss defects in the general physical development and in particular evidence of eunuchoidism. Eunuchoids may be of two types—the lean and the fat. Both have an arm span which is greater than the body height, and the distance from the symphysis pubis to the floor is greater than the distance from the symphysis pubis to the top of the head.

* The References will be published at the end of the concluding part of this article.

Usually the beard growth is reduced, the pubic hair tends to the female type, and the voice may be high pitched. In the fat type there is extra fat especially above the hips. Gynaecomastia as a sign is always looked for, whether associated with eunuchoidism or not. Hepatomegaly is also specifically excluded and so are signs of present or past avitaminosis or malnutrition. Signs of hypothyroidism are looked for, and the thyroid gland is inspected.

Local Examination. This entails careful inspection and palpation of the external genitalia and accessory glands. The size and development of the penis, scrotum and testes are noted. Hypogonadism, or reduced size of the external genitalia, is frequently associated with eunuchoidism. One looks for congenital anomalies like hypospadias and cryptorchidism. Undue softness of the testicles and lack of sensation are easily noted and indicate atrophy.

The epididymes are normally readily palpable, but if they are very easily felt and rather prominent it is suggestive of obstruction. In these cases the testes are of normal consistency. The point of obstruction is most commonly at the lower pole of the epididymis which is indurated. By rectal examination the state of the prostate and seminal vesicles is assessed. Regarding the prostate one judges the size and development which, if good, is an indication of a normal testis-interstitial-cell activity (testosterone). It is also important to try to assess the presence of prostatitis. If in doubt the prostate is massaged and the expressed secretion examined for pus cells. At the same time the seminal vesicles are felt. Induration suggests chronic vesiculitis, and these glands should be empty, or empty readily with gentle pressure.

A specimen of urine, freshly voided into a clean glass receptacle, should be examined in each case. A good stream and clear urine bespeak normal kidneys and no urethral stricture. Threads and pus are suggestive of prostato-vesiculitis, and in all cases the urine is tested for sugar and albumen. Impotence may be an early symptom in diabetes mellitus.

Special Examinations:—1. Semen-analysis.[1, 2, 4, 5, 6]
2. Testis Biopsy.[7, 8, 9, 10]
3. Post-Coital or Sim's Test.
4. Basal Metabolic Rate.
5. Hormone Assays.

The semen-analysis. This is the most important single test for the appraisal of male fertility. The specimen should be collected by masturbation or coitus interruptus directly into a clean, dry, glass receptacle with a wide mouth and should reach the laboratory within three hours. The time of ejaculation should be noted on the bottle. The use of a condom, even a carefully washed one, is not satisfactory because rubber, plain water and certain chemicals on the rubber are spermaticidal. The specimen is best kept at room temperature. It is most important that the specimen represents the whole ejaculate, because it has been shown that 75% of the sperm are found in the first third of the ejaculate. A period of two to three days' abstinence from sexual intercourse must be enjoined before the specimen is collected, unless the sexual habits of the patient are unusual. One therefore inquires how frequently intercourse occurs, and makes the period of abstinence equal to what is usual for the patient.

The analysis should include volume, turbidity, viscosity, count, morphology and motility. The importance of the hyaluronidase content has not as yet been clearly established and may be called for only in exceptional cases. The important factors are the count, the morphology and the motility, and of these the count is the most useful index of fertility. The factors of volume, turbidity and viscosity are extremely variable as useful indices, and in addition increased viscosity or lack of normal liquefaction is a physiological process which is not as yet understood. Semen when ejaculated is jelly-like. Within 15 to 20 minutes it begins to liquefy and the spermatozoa show increased motility. For this reason a specimen of semen should not be examined until it is 30 minutes old. The normal volume ranges between 2 and 5 c.c., but volumes up to 8 c.c. are by no means uncommon. Large volumes by no means bespeak greater fertility because quite often the density (or count per c.c.) of spermatozoa is reduced in the large volume semens. There is plenty of evidence to support the view that density is of greater value for good fertility than the total count of the whole specimen. Reduced volumes are also significant; and since the bulk of the ejaculate emanates from the seminal vesicles, a low volume suggests poor accessory gland development or blocked ejaculatory ducts. Volumes below 1.5 c.c. are immediately suspect of infertility and are frequently associated with other defects.

The important triad is count, morphology and motility. On good grounds we can accept that good motility of spermatozoa is necessary for a good fertilizing capacity. In every specimen of semen all the spermatozoa are not equally motile, and even in specimens of known fertility, there are a number of non-motile spermatozoa present. Motility then should be graded as good, fair, poor or absent and the percentage of spermatozoa showing maximum motility should be estimated. A specimen showing less than 50% of spermatozoa with less than fair motility is suspected of sub-fertility. It will be realized that the appraisal of motility is subject to the experience and whim of the observer.

The morphology of the spermatozoa is judged on a stained smear like in a differential white cell count. There are accepted standards for the normal spermatozoa, and in every smear there are a number of abnormal forms. When the number of abnormal forms exceeds 25% the specimen is suspected of sub-fertility. Here, again, one depends on the judgment of the microscopist, and some observers are more strict than others in calling a given sperm normal or abnormal.

The spermatozoa count is done like in a white cell count, and although there is a certain margin of error, this factor is more dependable than either motility or morphology. The count is expressed as the number of spermatozoa per c.c. of seminal fluid and thus donates the density of spermatozoa. When the count is reduced we speak of oligo-zoospermia. The average normal count is in the region of 120 million spermatozoa per c.c. It has been quite conclusively shown that the density is a reliable index of fertility, and that invariably when the density is reduced the percentage of abnormal cells is increased, and the grade and percentage of motility is reduced. The difficulty remains in establishing a level of density below which a specimen is regarded as infertile. Until quite recently a large body of authoritative opinion inclined to the view that 60 million spermatozoa per c.c. was the lower level of

fertility. However, 25% of men of known fertility have counts below 60 million per c.c.,[4] and some men have extremely low counts when they have become fathers. The fact of the matter is that as long as there are even a few motile spermatozoa in the semen, fertilizing capacity is possible, and one must constantly bear in mind that conception is the result of the fertility capacity of both the male and the female and fertility in either may be good, fair or poor.

From a practical point of view, however, one must be prepared to give an opinion, and in my view the best opinion is that which is based on the findings in large groups of cases. McLeod[5] has recently examined 1,000 men of known fertility. Seventy-five per cent of them had counts over 54 million, 20% had counts between 20-60 million, and 5% had counts below 20 million. But in addition he found that in this group whenever the count was low, i.e. below 60 million per c.c., the morphological characters and the motility were good or excellent. He thus regards these factors of morphology and motility as compensating for the reduced density. On this basis then a specimen with reduced density will be labelled sub-fertile, unless the morphology or motility are better than one would expect. A specimen then with a count of less than 20 million per c.c., with more than 50% abnormal forms, and with less than 30% of sperm with good motility, would be regarded as most probably infertile. At the same time one should never inform a patient that he is completely infertile if his semen contains only a few spermatozoa. Even when there is complete absence of spermatozoa in repeated specimens one should be extremely careful in imparting the knowledge to the patient.

As a result of the semen-analysis, three groups of patients will be found, and each group needs special study and clinical management.

Group A will have normal semen as judged by the standards set down.

Group B will have a reduced count, and probably other adverse factors; this will be called oligozoospermia.

Group C will have no spermatozoa or azoospermia. Because the semen in even normal men can vary as the result of many factors, at least two and probably three specimens should be obtained from group B and C before further steps are taken.

Group A. One can report to the referring practitioner that the patient is apparently normal, and that steps should be taken to examine the wife. If the examination of the wife shows her also to be of normal fertility, a Sim's post-coital test should be done. The pair are instructed to have intercourse at the ovulatory phase and a smear of cervical mucus is examined six to 24 hours later for the presence of actively motile spermatozoa. In the normal test 10 to 100 sperm per high power microscopic field are seen. A positive finding augurs well for eventual conception. A negative test means poor sperm invasion which usually is due to cervical pathology, but sometimes must be put down to unexplained incompatibility between the particular man and woman.

Group C, with azoospermia. Do a testis biopsy; but this depends on the clinical findings. It should be stressed that azoospermia is only diagnosed when repeated semen-analysis show complete absence of spermatozoa or immature products of spermatogenesis in a centrifugalized specimen of semen. Azoospermia should be considered as belonging to one of two main subgroups, the obstructive and the non-obstructive. The obstructive group is due to a block in the epididymis or vas deferens. The commonest cause is gonococcal or non-specific epididymo-orchitis, and the findings are normal testes, bilateral induration of the lower pole of the epididymis, full turgid epididymes, a semen of normal volume but with no spermatozoa. A less frequent cause of obstruction may be congenital obstruction of the epididymis, congenital absence of the vasa deferentia, obstruction to the vas the result of operation in the inguinal area, and obstruction to the ejaculatory ducts the result of infections or trauma in the posterior urethra. The last-named cause, however, although rare, must be suspected when in addition to azoospermia there is reduced volume of semen.

The non-obstructive group of azoospermias is due to testicular lesions which may be primary or secondary, and are clearly differentiated from the first group, because there is invariably hypogonadism or reduced development of the external genitalia. The cause may be germinal aplasia of congenital origin, or the result of cryptorchidism, mumps with orchitis, or exposure to X-rays. These are primary testicular failures, to be distinguished from secondary testicular failure, which is rarely seen in sterility clinics and is due to a primary pituitary lesion. These conditions and their diagnosis will be considered in greater detail later on.

Although the diagnosis of obstruction to the vas can be surmised clinically, in order to separate the obstructive case from the various other causes of azoospermia, a testis biopsy is made. It is a simple procedure, done under local anaesthesia and the patient need not be hospitalized. The findings in obstructive cases are typical. Normal spermatogenesis proceeds in spite of the block and the tubules are full of desquamating cells. The whole appearance is that of choked tubules with compression of the interstitial cells. It is interesting to note that normal spermatogenesis proceeds only when the point of obstruction is at, or distal to, the lower pole of the epididymis. The epididymis acts like a safety valve in decompressing the testis probably by absorbing the products of degenerated spermatozoa. Testis biopsy serves to pick out those cases suitable for operation, which will presently be described. It also gives a lead in the diagnosis of some of those cases which are not obstructive.

Group B (Oligozoospermia). One can immediately state that this is the most difficult group both as to diagnosis and treatment. As in group C, there are also two subgroups, the obstructive and the non-obstructive, but here the obstructive group is very small and the obstruction is unilateral or partial. As before the diagnosis of obstruction is made on clinical signs and confirmed by testis biopsy. The obstruction being unilateral, there is oligozoospermia rather than azoospermia. This group is small because most of these individuals fall within normal fertility limits and are not seen for sterility study. Those that are seen are more often those with partial obstruction (on one or both sides) to the vas deferens in the region of the prostate or obstruction to the ejaculatory ducts. The obstruction is invariably due to inflammatory conditions of the prostate and vesicles, and this is the small group which benefits by local treatment of the accessory genitalia.

By far the larger group with oligo-zoospermia are due to a variety of causes which are listed as congenital, constitutional, nutritional, toxic, hormonal and unknown. Since as a whole the response to hormone therapy in this group has been very disappointing, it is doubtful if

hormonal factors are of any importance. In fact all therapy is disappointing because the etiology is as yet obscure. When the oligo-zoospermia is severe, i.e. the count is below 20 million, I am in favour of testis biopsy. It gives one a visual idea of the faulty spermatogenesis. In many instances it gives a clear lead to a hopeless prognosis, so that unnecessary treatment is avoided. In other cases the tissue clearly shows only minor departure from normal and treatment is justified. In addition, if ever we are to rescue from the scrap heap of oligo-zoospermia, cases which will respond to treatment, I am sure that the histologic picture will become an even greater aid than it is at present.

In assessing a case of male fertility, one may need other special tests. A basal metabolic rate is indicated in all cases of oligo-zoospermia of unknown origin. It is thought that sub-clinical hypothyroidism may be a factor in some cases of reduced fertility. Readings of −10% to −20% are quite frequently found, and are an indication for a trial of thyroid therapy. Low B.M.R. readings are the usual findings in cases of eunuchoidism.

There are occasions when special hormone assays are useful in establishing the diagnosis of eunuchism, although the clinical signs are so definite that laboratory proof is hardly necessary. The level of 17-ketosteroids in the urine is used as an index of maleness, although one knows that the 17-ketosteroids are derived from both testicles and adrenal cortex, so that it is not a pure test of the functional activity of the interstitial or Leydig cells of the testis. It is of more use in the diagnosis of virilism in females. It is invariably reduced in cases with eunuchoidism.

The bio-assay of urinary gonadotropins is a well-established and valuable procedure which unfortunately is not as yet generally available because of the lack of facilities for experimental animals. I believe that treatment with gonadotropins is not justified until one has demonstrated reduced output of urinary gonadotropins in the patient. Knowledge of the gonadotropin level permits one to diagnose a case of hypogonadism as primary testicular or secondary to pituitary failure. In the primary testicular failures there are found higher than normal values for urinary gonadotropins. In the smaller group of patients with secondary testicular atrophy there is found a lower than normal value for gonadotropins. These are the small group with primary pituitary failure, usually azoospermia and undifferentiated testis-tubule histology, which respond to treatment with gonadotropins.

Other cases of hypogonadism have normal gonadotropin values, and this would appear to be the case when the Sertoli cells are intact. In large numbers of men with oligo-zoospermia no abnormality of the gonadotropins has been found. The test then is indicated in cases of hypogonadism, to diagnose whether the fault lies primarily in the testes or in the pituitary, and upon the result of the test is based the rationale of treatment with either gonadotropins or male hormone. The larger majority of patients with hypogonadism are primarily testicular and have raised urinary gonadotropins. Treatment with gonadotropins then could have no effect. So also one would not expect (and experience has confirmed this) favourable results with gonadotropin therapy in the large group of oligo-zoospermia which invariably have normal values for gonadotropin excretion. The details of treatment will be considered in the concluding article.

(To be continued)

HEART DISEASE IN PREGNANCY*

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Pregnancy, although a physiological process, brings even to the healthy woman a train of cardio-vascular trials and tribulations. There is an increase of metabolism and blood volume. The oxygen consumption increases by about 20% and the cardiac output by about 50%. There is often, after exertion, breathlessness of minor degree due to increasing pressure on the diaphragm. As the uterus enlarges abdominal veins get pressed upon causing oedema of ankles. There may be attacks of faintness and, because of the rising diaphragm, the cardiac apex is displaced upwards and outwards. The pulse rate, pulse pressure and venous pressure is increased, systolic murmurs, extrasystoles, accentuation of the third heart sound and alterations in the electrocardiogram make their appearance. All these are functional and do not indicate disease. We must learn to know the normal to enable us to recognize the abnormal when it appears. The most important question in heart disease in pregnancy is prognosis, which can be one of the most difficult problems in medicine. When a patient with organic heart disease reaches the stage of advanced pregnancy, her exercise tolerance is reduced due to the combined factors of increased pressure on veins, displacement of heart with increased output and increased oxygen consumption. Thus tolerance becomes important in assessing the risks of pregnancy.

Additional factors to be considered are toxaemia of pregnancy and possible septic complications; on damaged valves the latter may result in a bacterial endocarditis.

Another matter of importance is ante-natal supervision; for, where this has been lacking and patients admitted as 'urgencies' into hospital, the death rate has been 44% compared with 1% in so-called 'quiet' cases. At the Boston lying-in hospital, ante-natal supervision reduced the mortality from 12% to 3%.

The chief pathological conditions that may affect the heart in pregnancy are:—

(a) Rheumatic, thyrotoxic and hypertensive disease.
(b) Congenital heart anomalies.
(c) Bacterial endocardial disease.

*Paper read before the King William's Town Division of the S.A. Medical Association.

Congenital heart anomalies are not hereditary and so there is no danger of transmission to the foetus.

Patent ductus arteriosus and *patent interventricular septum*, if not of severe degree, are no bar to pregnancy. The former has 4% mortality, the latter 2%.

Coarctation of the aorta does not generally give rise to trouble, although in a few instances rupture of the aorta has occurred. However, the associated hypertension is sometimes mistaken for toxaemia of pregnancy.[1]

Atrial septal defect is usually free from trouble unless there is much hypertrophy of the right ventricle, in which case, as the pressure in the right auricle rises it may precipitate acute right heart failure.

Pulmonary stenosis is usually a bar to pregnancy as, in fact, are most cases of congenital heart defect in which cyanosis and breathlessness are prominent. Patients with acyanotic congenital heart disease tolerate pregnancy extremely well.[2] No woman with a congenital cardiac lesion should be allowed to go into pregnancy without a careful cardiological overhaul.

Thyrotoxicosis is usually made worse by pregnancy and such women should be advised against conception. Even if these thyrotoxic cases are treated with rest, thiouracil and iodine, and perhaps greatly improved thereby, they are very apt to relapse during pregnancy. Cases of sudden death have occurred even while under treatment and while they appeared to be doing well. It is important to remember that thiouracil may affect the infant and cause it to be born with goitre. It is said this can be prevented by combining iodine with the thiouracil; in any case, the dose of the latter should not exceed 0.2 gm. daily.

If a woman develops thyrotoxicosis during pregnancy, small doses of thiouracil and iodine may be tried, if no response, partial thyroidectomy is indicated. In the case of a patient who has had a thyroidectomy, one year at least should be allowed to elapse before conception can be considered.

Hypertension discovered during pregnancy, may be due to chronic essential hypertension or to toxaemia of pregnancy. With the aid of rest, diet, and sedatives mild cases of hypertension may go on to term without serious mishap. But women with a blood pressure of 160/100 mm. Hg should be advised against pregnancy because of the risk of toxaemia, cerebral haemorrhage, or of left ventricular failure. The infant mortality in these hypertensive cases is high, about 66%, according to Browne (1947). If a woman with permanent high blood pressure, and not the kind that fluctuates between wide limits, becomes pregnant the uterus should be emptied at the earliest opportunity.

Rheumatic Heart Disease. I have left the consideration of this to the end for it is the commonest heart trouble with which we have to deal, and one which taxes all our knowledge and clinical experience to the full and gives the medical attendant many an anxious moment. Out of a total of 29,713 women attending Queen Charlotte's Maternity Hospital, London, between the years 1937-1946 inclusive, there was a mortality of 3%: of these maternal deaths 11% were due to heart disease. The commonest form of rheumatic heart disease in pregnant women is mitral stenosis, forming over 50% of all cases. The commonest form of cardiac breakdown is auricular fibrillation and congestive failure. What advice should we give to a woman who has rheumatic or other disease of the heart and is desirous of bearing children? There are some who advise strongly against pregnancy, arguing that it will certainly shorten the patient's life. But are they justified in their opinion? Statistics published by Jensen (1938) afford food for thought. In four combined series the average age of death in nulliparous women with mitral stenosis was 36.6 years, in married women with families it was 40.3 years. Again Bunim and Rubricious (1948) could find no significant difference in the life histories of 169 rheumatic mothers and 215 rheumatic childless women. Of course, before we can take these figures at their face value we should remember that the childless women had probably been advised against pregnancy because of the severity of their heart disease. Anyway, we should not make a hard and fast rule but judge every case on its merits. Most of us can recall cases where women, in spite of a damaged heart, have borne three or even four healthy bonny children and have thus fulfilled their destiny in the happiest circumstances. Alas, we also remember those others who have passed on after much pain and suffering with their first-born. In assessing the case of say an otherwise healthy woman the question of age is important. Above the age of 30 years the risk is considerably greater in multiparae but equal in primigravidae. The matter of exercise tolerance must be gone into. If the patient has never had symptoms of shortness of breath, cyanosis and oedema and is able to follow her household duties without discomfort, the risk is slight, and she should be allowed one pregnancy as a sort of trial run. According to Bramwell's series the death-rate was 4.9% in primigravidae and 1.9% in multiparae. But where limitation of tolerance was present prior to pregnancy the mortality was 10% in primigravidae and 6.4% in multiparae. A history of repeated or persistent heart failure is an absolute bar to pregnancy. Any form of cardiac arrythmia is a strong argument against continuing the pregnancy. The early development of auricular fibrillation is of grave import.

However, as a matter of common experience we are usually asked to express our opinion when the woman is already pregnant and she either wants to keep her babe or is eager to get rid of it at the earliest opportunity.

As a guide in these cases we cannot do better than follow the classification for heart disease in pregnancy adopted by the New York Association in 1924. This classification is divided into four grades:—

Grade 1. Symptomless.

Grade 2. This consists of Grade 2a (with slight symptoms, such as slight shortness of breath, with some cyanosis, but no palpitation) and Grade 2b (with more severe symptoms, but without congestive failure or auricular fibrillation).

Grade 3. Auricular fibrillation or heart failure, past or present.

Treatment Suggested: *Grade 1.* No restrictions are placed here.

Grade 3. These women are strongly advised against pregnancy and if already pregnant and if seen within the first three months, termination is recommended. As a matter of practical interest, if a woman has had a heart break-down with a previous pregnancy she should not be allowed to essay another attempt; the risk of serious cardiac failure is too great.

Grade 2. Patients in this grade present the most difficult of problems. A woman may start off as Grade 2a, with

slight symptoms and in a month or six weeks pass into Grade 2b, or may rapidly pass into Grade 3, with auricular fibrillation and congestive failure. However, before discussing the important question of treatment I wish to draw your attention to certain recent work done on the estimation of 'Cardiac Output in Normal Pregnancy as Determined by Right Heart Catheterization'.[3] It was estimated that in 24 normal non-pregnant women the mean cardiac output was 4.5 litres per minute, while in 68 pregnant women, the output was 5.7 litres per minute. In these latter the output began to rise between the 10th and 13th week and reached its maximum around the 32nd week of pregnancy after which there was a steady fall until the 40th week when the output was 4.6 litres per minute. Heart failure rarely occurs after this period, associated with this diminishing output there is a decrease in blood volume. The fact that the cardiac output returns to normal before the onset of labour is of considerable clinical interest. The work of the heart has decreased during the last weeks of pregnancy and at term it has sufficiently recovered to deal with all emergencies which may arise, particularly in the third stage of labour. It would thus appear that the practice of inducing premature labour at the seventh month is physiologically unsound for at this month the heart is under its greatest strain and it would surely be better practice to allow pregnancy to proceed to term by which time the cardiac output is back to normal and strain minimal. Further this investigation underlines the clinical fact that the results of therapeutic abortions are better if done before the 12th week for it is after this time that the cardiac output begins to rise with consequent increase of strain, which on a heart damaged by disease is a serious factor.

The present trend of practice in the care of the cardiac patient during pregnancy is best presented from an analysis of 20 years' experience of the Cardiac Clinic of the Ante-Natal Department of the Maternity Wing of the Royal Infirmary, Edinburgh. The analysis was conducted and reported upon by Dr. Ray Gilchrist.[4]. He says, *inter alia*, that obstetrical interference is best avoided in the later months, and he lays emphasis on employing more prolonged periods of bed rest throughout the pregnancy and warns against the dangers of caesarean section at any time. Even in cases of grave cardiac distress statistical evidence suggests that pelvic delivery is safer than abdominal and it cannot now be held as an argument in favour of caesarean section that it enables the operator to perform sterilization at the same time for there are other and safer means towards attaining this end. It is safer to allow patients with even serious heart failure to go to term and then expedite delivery with forceps. The results of premature interference are apt to be calamitous. At the New York Lying-in Hospital of 26 patients delivered by caesarian section, three died; while with 136 patients with heart disease of comparable severity, delivered by the vaginal route, none died. Modern obstetrical opinion suggests that caesarean section should be reserved only for those cases with cardiac failure where, in addition, there are reasons present which interfere with delivery. The maternal mortality rate for this class of case is in the neighbourhood of 40% with an infant mortality of 31% (Pardee, 1934). It can be safely said that pregnancy should never be terminated until the cardiac condition has been carefully brought under control with digitalis or other drugs. These patients must have long periods of bed rest and be kept fully digitalized during the carrying period.

Salt retention plays a most important part in pregnant patients with heart disease, particularly in those confined to bed, and it is a common cause in precipitating heart failure. Also these patients should never be transfused, for increase of blood volume may easily start acute pulmonary oedema or a sudden right heart failure. The early signs of cardiac failure must be looked for. These, according to Mackenzie (1921) are appearance of persistent rales at the lung bases. With the help of cardioscopy we are able to recognize increasing pulmonary congestion earlier than with ordinary clinical methods, but it is well to remember that sudden acute right heart failure may develop without preceding recognizable pulmonary congestion, and while regular rhythm is still present.[2] The puerperium is the most critical period, for it is in the puerperium that sudden cardiac failure is liable to occur, also pulmonary or cerebral embolism. If the patient is past the third month, no matter how ominous the signs and symptoms, we should leave matters alone, trusting to bed rest, digitalis, etc., to see her through. Digitalis and other drugs used in treating the mother do not appear to affect the infant harmfully.

As a precautionary measure every pregnant woman who has a damaged heart should be subjected to a cardiological overhaul and her chances carefully weighed, for upon this will depend her own life and probably that of her infant.

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ABSTRACTS

Effect of Vitamin B_{12} on the Haematopoietic and Nervous Systems in Addisonian Pernicious Anaemia. B. E. Hall and D. C. Campbell (1948): J. Lab. Clin. Med., **33**, 1646.

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VAN DIE REDAKSIE

STERILISASIE

Daar is baie valstrikke op die weg van die mediese praktisyn, waarvan dié voortspruitende uit operasies om sterilisasie te veroorsaak, geensins die minste is nie. In hierdie gevalle gaan dit oor sowel morele as geregtelike vraagstukke sodat dit, uit 'n professionele oogpunt beskou, 'n ingewikkelde en moeilike saak is waaroor tot 'n besluit te geraak.

Soms ontstaan daar verleentheid en twyfel oor waar 'n mens jou bevind. 'n Klassieke voorbeeld is die geval met die saak omtrent *Beatty* v. *Cullingworth*.[1] In daardie geval het regter Hawkins hom as volg uitgelaat: „Ingeval 'n medikus 'n operasie maak uit 'n begeerte om die beste vir sy pasiënt te doen, dan sou dit mensliewend wees van hom om alles in sy vermoë te doen om die kwaad te verwyder, met dié voorbehoud dat hy geen bepaalde opdrag ontvang het om nie te opereer nie. „Sou enige chirurg," het hy vraend voortgegaan, „'n operasie onderneem terwyl hy gebind word deur 'n voorwaarde soos wat klaagster voorgewens noem, naamlik, dat al sou 'n operasie volgens die mening van die chirurg absoluut noodsaaklik lyk, hy dit nogtans nie moes doen indien die kwaad ietwat erger voorkom, as wat hy vooraf gemeen het nie?" Die jurie het mnr. Cullingworth in die gelyke gestel en daarby die unanieme mening uitgespreek dat die saak nooit moes gedien het nie"[2].

Bevoegde wetgeleerdes het die mening uitgespreek dat die chirurg in hierdie geval gelukkig was, want hy het nie slegs geen toestemming ontvang nie maar was ook herhaaldelik en uitdruklik versoek om nie beide ovaria te verwyder nie. Hieruit volg dat geskrewe toestemming altyd verkry moet word vir 'n bepaalde operasie, wat die chirurg wil maak en by sodanige verlof moet ook ingesluit word verlof tot enige alternatiewe optrede wat die chirurg mag nodig ag tydens die ingreep.

Daar kom tye wanneer die pasiënt geen toestemming mag gee nie, omdat die ingryping onwettig sal wees. Die Staat het b.v. daar belang by dat sy burgers tot voortplanting bekwaam sal wees. Dit is feitlik seker dat 'n snydokter 'n manspersoon nie mag steriliseer enkel om voortplanting te voorkom nie. Harcourt Kitchin is van die mening dat dit moontlik is dat 'n chirurg 'n vrou nie mag steriliseer, selfs met haar verlof, as hierdie die enigste rede vir die ingreep is nie. Maar as die operasie *in belang*

1. Kitchin, D. Harcourt (1936): *Legal Problems in Medical Practice*, p. 29. Londen: Edward Arnold en Kie. 1936.

2. *Op. cit.*, p. 30.

EDITORIAL

STERILIZATION

Many legal pitfalls beset the path of the medical practitioner, not least among them being created by the difficult problem of operations for sterilization. Here the issues are moral as well as legal and the professional decision is often a complicated and difficult one.

Sometimes there is confusion and doubt about the position. This was, of course, the case in the classical instance of its kind, viz. *Beatty* v. *Cullingworth*.[1] In that case Mr. Justice Hawkins said: "If a medical man with a desire to do his best for his patient undertook an operation, it was a humane thing for him to do everything in his power to remove the mischief, provided that he had no absolutely definite instructions not to operate. "Would any surgeon" he asked, "undertake an operation fettered by such a condition as the one which the plaintiff suggested—namely, that if the operation was, in the surgeon's opinion, absolutely necessary, still he should not perform it if he found that there was a little more disease than he had supposed?" The jury found a verdict for Mr. Cullingworth, and expressed the unanimous opinion that the action should never have been brought."[2]

Experienced legal opinion has expressed the view that, in this case, the surgeon was lucky because he did not only obtain no consent, but had also been told several times explicitly not to remove both ovaries. Clearly, therefore, written consent for a particular operation which the surgeon intends to do should always be obtained, and this written consent should include permission for alternative operative measures if the surgeon finds them necessary during the course of the operation.

There are times, however, when consent cannot be given by the patient because the operation itself is illegal. The State, e.g. has an interest in the ability of its citizens to procreate. It is fairly certain that a surgeon may not sterilize a man if the object of the operation is solely to avoid procreation. Harcourt Kitchin takes the view that it is possible that a surgeon may not sterilize a woman, even with her consent, if this is the only reason for the operation. But if the operation is *in the interest of the*

1. Kitchin, D. Harcourt (1936): *Legal Problems in Medical Practice*, p. 29. London: Edward Arnold and Company. 1936.

2. *Op cit.*, p. 30.

van die pasiënt se gesondheid is, dan sal daar geen kwaad oor die chirurg kom nie hetsy hy opereer aan 'n manlike of aan 'n vroulike persoon. Hy behoort egter ,seker daarvan te maak dat gesondheid bedreig sou word indien hy nie ingryp nie, anders sal hy homself blootstel aan kriminele vervolging."[3]

Hedendaagse medici sal ongetwyfeld in staat wees om baie en goeie voorbeelde na vore te bring, op grond waarvan 'n sterk saak gestel kan word om 'n bepaalde kliniese stoornis by 'n ouer te beskou as iets wat daardie ouer ongeskik maak om kinders te hê, al is dit onskadelik vir dié ouer se gesondheid. Nogtans lyk dit of selfs hierdie sterk gegronde argumente huidig nognie voldoende is vir die wettiging van so 'n operasie nie.

Terwyl *verpligte* sterilisasie van hierdie soort van gevalle, sy hul geneties vasgestel of nie, wellig nie die unanieme steun, óf van binne die beroep self óf daarbuite, sal kry nie, bly daar nogtans vele oor wat die mening toegedaan is dat dit reg en goed sou wees om sterilisasie te wettig wanneer daar *vrywilliglik* om versoek word, op grond van 'n goeie kliniese rede, soos b.v. idiopatiese epilepsie.[4] Dit sou redelik wees om ons wetgewing so te verander dat dit 'n ingryping van hierdie aard wettig.

3. *Op. cit.*, p. 32.
4. Redaksioneel (1950): Hierdie *Tydskrif*, **24**, 752.

patient's health, no harm will come to the surgeon, whether he is operating on a male or a female. He should, however, "satisfy himself that health would be seriously endangered if he did not do it, or he will risk a criminal prosecution".[3]

Modern medical opinion can undoubtedly produce many good instances in which a strong case can be made out to regard a particular clinical disorder in a parent as one which renders that parent unsuitable to bear children, although there is no immediate threat to that parent's health. There seems little doubt, however, that even these strong arguments are not sufficient grounds for the legal performance of the operation at present.

While *compulsory* sterilization for this category of conditions, whether genetically determined or not, is unlikely to find unanimous support either inside the profession or outside it, there is, nevertheless, a strong body of opinion which feels that it is right and proper to legalize sterilization if it is sought *voluntarily* for a good clinical cause, e.g. idiopathic epilepsy.[4] It would be reasonable to amend our law to make this kind of operation lawful.

3. *Op cit.*, p. 32.
4. Editorial (1950): This *Journal*, **24**, 752.

A MECHANICAL HEART-LUNG DEVICE FOR USE IN MAN*

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Our aim was to construct an apparatus for artificial circulation and oxygenation, which can replace man's organic heart and lungs for an unlimited time.

The mechanical lung must have an oxygenation capacity of about 300 c.c. oxygen per minute at a minute-volume of about 5 litres.

The mechanical heart must be able to perform the whole function of the organic heart, i.e. maintain the whole circulation in the entire body, including the coronary and the bronchial circulations. In doing so, the heart cavities and the lungs are empty of blood and intracardiac operations are possible, as we proved in experiments in dogs. We proved also that dogs stand (without any early or later distress) artificial circulation and respiration for many hours. The use of our heart-lung device is not confined to heart surgery alone; we expect that it also can be used to substitute for the heart or the lungs for a period of some days.

We sought a means of application of the mechanical system which would require a minimum of surgical intervention.

In this article I only give a short description of the apparatus. Details and experimental results are described elsewhere.[1-3]

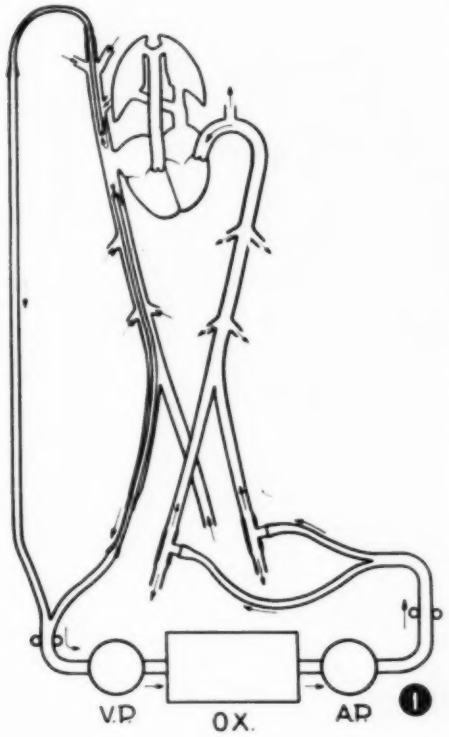
Fig. 1 shows the method of application of the system. Catheters are introduced in the caval veins through the right external jugular vein and the right femoral vein respectively, their openings lying near the right auricle. The catheters are connected to a pump (V.P.). This becomes the venous pump or artificial right heart. The outlet of the venous pump leads to the oxygenator or artificial lung OX. The outlet of the oxygenator goes to the arterial pump A.P. (the artificial left heart) from which tubing leads to two cannulas inserted into the femoral arteries. Thus only three cutaneous incisions are necessary to connect the apparatus with the subject.

If the catheters and the cannulas are in position, the circulation goes on normally; but if the pumps are started (Fig. 1) the following happens:

The blood proceeding in the caval veins towards the heart is sucked back through the catheters by the pump V.P. just before it was to enter the right auricle. It is then forced into the oxygenator, where it is oxygenated and loses its superfluous carbon dioxide and, by pump A.P., is forced into the femoral arteries. Part of this blood goes in the normal direction towards the hind limbs; the greater part goes in an abnormal direction up the aorta and into its branches. As the heart cavities are empty (or nearly so),

* Report of a lecture delivered at a meeting sponsored by the Cape Town Post-Graduate Medical Association, the Cape Western Branch of the Medical Association of South Africa and the University of Cape Town on Tuesday, 15 May 1951.

the pressure in the left ventricle will be low, whereas the pressure in the aorta is constantly high (the artificial pressure of the pump). The result is that the aortic valves remain constantly closed.



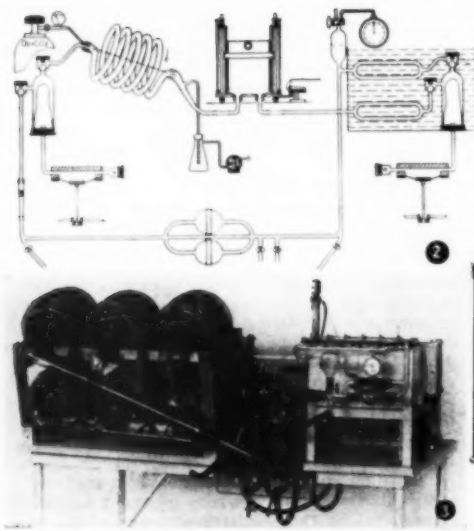
As is easily seen, the heart and the lungs receive no blood except for the coronary and the bronchial circulations. Also the rest of the circulation is maintained normally. Thus the organism as a whole remains in a normal condition, and both the heart and the lungs are able to resume immediately their normal functions as soon as the mechanical device is switched off.

It appears from Fig. 1 that the principal parts of the system are the venous and the arterial pumps and the oxygenator. Fig. 2 shows in a schematic way the general construction of the apparatus.

The tube on the left is connected to the catheters in the caval veins. This tube is connected with the system of venous pumps, which consists of six small units (modified Dale-Schuster pumps). Only one of these units is drawn. The fingerstall inside the plastic container is expanded and retracted by means of air, moved by a membrane pump. The advantage of the air transport is that the movements are very gentle, so that haemolysis does not occur. By means of an adjustable air-leak the stroke-volume of each pump can be regulated. The six pumps work alternately, one overlapping the other, so that a constant suction from the caval veins ensues. The minute-volume of the venous pump system can be read continuously on a rota-meter. The oxygenator also consists of six units, one for each venous pump. The oxygenator unit is a plastic tube, about 30 feet long and $\frac{3}{4}$ inch in diameter. This tube is bent in the form of a threefold spiral (only one simple spiral is drawn). The beginning and the end of this tube lie in the same axis, round which the spiral turns, synchronously with the venous pump. At each turn of the spiral it receives a quantity of blood from the pump. The blood moves through the spiral, making a thin film with constantly changing surface. In this way the blood comes in contact with oxygen (containing about 5% carbon dioxide), which constantly flows through the spiral tube. Thus the blood is readily oxygenated. The superfluous oxygen and the removed carbon dioxide escape at the end of the spiral. There is no haemolysis and no foaming in the oxygenator. The oxygenated blood is collected in a glass vessel. The tubing between the spirals and the vessel is partly flexible, so that the vessel, which hangs in the spiral springs, can move up and down. If the blood level is high, the vessel is heavy, stands low and closes a mercury contact, putting the arterial pumps into action. If the blood level in the reservoir is low, the vessel rises, breaks the contact and the arterial pumps stop. As the blood-flow from the spirals goes on, the level rises again and the arterial pumps start working. In this way the arterial pumps are prevented from sucking air, which would cause air embolism. If properly adjusted, the arterial pumps stop two or three seconds every five or six minutes. Once adjusted, the system works automatically. In the collecting tube between spirals and reservoir some air bubbles may appear from time to time. These few bubbles are sucked away into a small vacuum vessel. The six arterial pumps of the same type as the venous pumps suck the arterial blood out of the reservoir and pump it under pressure in the tube (lower right) connected with the cannulas in the femoral arteries. The six arterial pumps work three at a time, so that a real pulse results. The arterial tubing has an expansion vessel and connected to it is a blood pressure metre. The arterial pumps and their tubings are submerged in a water bath, to heat or cool the blood if necessary. The arterial and the venous tubes are connected by a shunt tube. Thanks to this the blood can circulate in the apparatus and be kept oxygenated and at the right temperature while the subject is being prepared. When the catheters and the cannulas are inserted and connected to the machine, one has only to open these connexions and to close the shunt to start the artificial circulation.

The shunt has two side tubes for filling and emptying the system. It is advisable to fill the apparatus with blood beforehand. The dead space is about 1 litre. Parallel to the shunt are two fine nickel filters. They withhold small clots which might appear in the blood used for filling the apparatus.

The whole apparatus is easily sterilized by perfusing it (under its own power) with a disinfecting fluid. Penicillin is added to the blood, which is also heparinized.



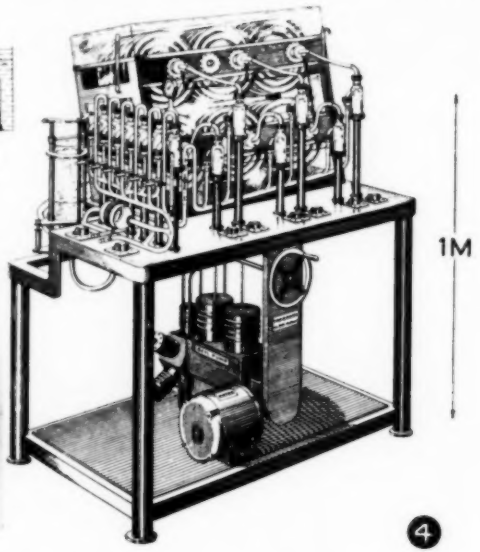


Fig. 3 gives an over-all view of one of our machines. The different parts are easily recognizable.

Fig. 4 gives the latest version of the machine as it will be manufactured. One recognizes the six venous pumps leading to the spiral oxygenator, the regulating reservoir and the six arterial pumps. The water bath is omitted. The spirals are contained in a plastic case and this space can be heated electrically if necessary. The air pumps are placed underneath the table. They are piston pumps of a very special type, which need no lubrication whatsoever. The whole machine is driven by an electric motor. For emergency cases a hand-wheel is provided. This apparatus is under construction. We hope to demonstrate it at the International Surgical Congress at Paris in September 1951.

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CONTROL OF SURGICAL BLEEDING

BY THE PRODUCTION OF HYPOTENSIVE STATES

A PRELIMINARY REPORT

P. S. JENKIN, M.B., CH.B., D.A. (R.C.P. & S., ENG.)
Department of Anaesthesia, Groote Schuur Hospital, Observatory, C.P.

The deliberate reduction of blood pressure during surgical operations comes as an interesting reversal of currently accepted practice. The number of vasopressor drugs at present on the market bears adequate testimony to the belief that a fall of blood pressure during surgery, conducted under any form of anaesthesia, is of serious import requiring immediate correction.

It cannot be denied that under certain circumstances the blood pressure level is of fundamental importance in assessing the integrity of the individual's cardio-vascular status, but it is equally true that states of profound hypotension can be borne for not inconsiderable periods by reasonably fit individuals—and apparently, without any detectable harm. It is at present not clear for how long such periods of hypotension can be safely borne, but it would seem that 6 hours is within the zone of safety.[1] In this connection it is interesting to quote the following case:

S.B., a rather frail, ill-nourished male of 59, B.P. 150/90 mm. Hg. was scheduled for a gastrectomy for pyloric carcinoma. Immediately following induction with Thiopentone, 0.4 gm. and d-Tubocurarine 15 mg. it was thought cardiac arrest occurred, as no peripheral pulse could be felt

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and the buccal mucosa was practically white. There was a slight, if reassuring, cough on the passage of an endotracheal tube, and subsequently the only pulse which could be felt was the abdominal aorta. As obstructive symptoms were severe it was decided to proceed with a gastro-enterostomy. Throughout the operation no blood pressure could be detected by oscillometry or ausculation and the carotid pulse was only doubtfully palpable. Rapid transfusion only caused an obvious increase in venous pressure, and the only response to adrenaline and Methedrine was to produce tachycardia. Twelve hours post-operatively a blood pressure of 60 mm. Hg was obtained by oscillometry and, by the following morning, it had risen to 70 mm. Hg, during which time the patient produced 36 oz. of urine! Not until the end of the fourth post-operative day did the pressure rise to 100 mm. Hg systolic. During this time the only complaint was that of dizziness.

He was discharged on the sixteenth post-operative day. The cause of the 'collapse' was not clear. We were unable to find any evidence of cardiac infarction.

PHYSIOLOGICAL CONSIDERATIONS

It may not be out of place shortly to discuss the mechanism of the maintenance and alteration of blood pressure. If we accept that blood viscosity in a given case remains fairly constant then the blood pressure is a resultant of cardiac output and peripheral resistance. A fall of blood pressure could diagrammatically be represented thus:

TABLE I

Blood Pressure	
	1.—Peripheral Resistance
↓	2.—Cardiac Output
Fall	3.—Cardiac Output + Peripheral Resistance
↓	4.—Cardiac Output—Peripheral Resistance

1. This would occur with sympathetic block such as produced by spinal anaesthesia or chemical 'sympathectomisers'.
2. It is doubtful if this normally occurs during surgical operations.
3. This is the state of affairs in surgical shock, burns and possibly hypochloraemia. Here it can be seen that observation of the blood pressure level is of great importance.
4. This is probably what occurs with 'total sympathetic block'.

It is thus clear that for the most part the blood pressure level is an index of the peripheral resistance and not of the adequacy of the circulation. This is further emphasized when it is found that there is little diminution of cardiac output till the systolic pressure falls below 70 mm. Hg.[2] This, however, may be a misleading observation, as by posturing, with consequent 'pooling' of blood in the extremities there may be significant diminution of output This matter still awaits objective demonstration.

THE PERIPHERAL CIRCULATION AND TISSUE OXYGENATION

Provided there is full blood oxygenation and there is vasodilatation with adequate circulation, tissue oxygenation will result.[2] Blood to tissue oxygen transference is dependant, not on the blood pressure, but on the blood oxygen tension. It is difficult to be sure that normal capillary transfer of electrolytes, etc., will take place in hypotensive states. It is estimated, however, that normal plasma osmotic pressure is 25 mm. Hg.[2] If then, there is full arteriolar dilation, with normal metarteriolar and precapillary activity, it would not be unreasonable to assume that normal capillary diffusion can take place in the presence of very low blood pressures.

The Coronary and Cerebral Circulation. It is important, if a hypotensive state is produced that the flow through these important areas be unimpaired.

Concerning the coronary circulation, recourse must be made to animal experiments. Eckenhoff *et al.*[4] found that in dogs, a 56% reduction of blood pressure led to a 25% reduction of coronary blood flow; thus coronary flow became more abundant relative to cardiac needs. It is important, however, to consider the diseased coronary vessel. If the diminution of calibre remains constant it is probable that the blood flow will diminish *pari passu* with the fall of blood pressure. That this is important is clear from the frequent observation that anginal pain or actual infarction has occurred consequent upon falls of blood pressure, from spinal analgesia, severe haemorrhage or other causes. Any evidence, therefore, of coronary artery disease must constitute an absolute contra-indication to any hypotensive technique.

The Cerebral Circulation. The recent development by Kety[5] of techniques for measuring cerebral blood flow has supplied much information on this subject, although much remains to be done. Important factors seem to be, firstly, that Thiopentone narcosis reduces cerebral oxygen consumption by 40%.[6] Secondly, in hypertensives, a 26% fall of blood pressure resulted in only a 13% fall of cerebral blood flow (C.B.F.).[7] This would seem to parallel the state of affairs existing in the coronary circulation. Thirdly, in cerebral arteriosclerosis there is moderate to severe restriction of C.B.F. with a significantly higher cerebrovascular resistance (C.V.R.).[8] This third factor would thus seem, as with coronary disease, to provide an absolute contra-indication to any hypotensive technique.

CLINICAL APPLICATION

The rationale of the technique is not to stop bleeding altogether but to minimize troublesome and continued oozing from the operative site. Arterial bleeding still occurs, and to give an analogy—the spurt from a cut perforating intercostal vessel during a radical mastectomy will only be 2 inches high, instead of 6 inches—nonetheless it is quite obvious. The reduction of oozing will materially reduce operating time and difficulties and consequently, some post-operative complications, many of which bear a direct relationship to operating time.

Diminished blood loss may enable more radical procedures to be undertaken. Finally, absence of blood from the operative field may considerably facilitate access as evidenced during fenestration operations and some other E.N.T. procedures.

Experience has shown that optimal conditions are obtained when the systolic pressure has been reduced to 60-70 mm. Hg. The techniques of producing this hypotension are:

1. Chemical sympathectomy by various drugs of which Hexamethonium iodide (Hexathide (A & H)) appears at present to be the most satisfactory.
2. Spinal or epidural block.
3. Controlled arterial bleeding.

1. *Chemical Sympathectomy.* This, for the most part, is the easiest method and on the whole satisfactory and relatively free of sequelae. The extensive use of this method was first reported by Enderby[9] who emphasized the importance of posture in producing hypotension and in maintaining a relatively bloodless field. It soon became apparent to him that there were two types[10]: the older,

possibly hypertensive type who responded with a significant and often prolonged fall of pressure to small doses: the second, younger normotensive type who required larger doses, and in whom, sometimes, an adequate fall of pressure could not be obtained. This has been our general experience too.

Preparations and Dosage. Hexathide is made up in ampoules of 2.5 c.c., 10 mg. to each 0.5 c.c. Initially 10 mg. was given and the effect noted. The effect is apparent within a minute. This proved time consuming and unnecessary. Increasing experience has shown that if one assesses the type of case one can start with a dose of 30-50 mg. There appears to a dose which causes maximal response, beyond which increasing dosage produces little effect. It seems that with moderate doses there can be little fear of so-called overdosage.

2. *Spinal or Epidural Block.* For many years it has been recognized that there is less bleeding under spinal anaesthesia. Griffiths and Gillis[11] use the so-called 'total sympathetic block' in which a block up to T_1, cutting off all sympathetic fibres, applied to lumbo-dorsal sympathectomies with outstanding results. The importance of narcosis and adequate oxygenation was stressed. They have since applied this technique to over 600 cases.[2] Epidural block has been used by Bromage[12] and would seem to have certain advantages over subarachnoid block in so far as post-operative sequelae such as headache and eye disturbances are concerned. The disadvantage is the somewhat greater difficulty of producing an epidural block, its inherent defect of occasionally producing patchy analgesia, and the time required to produce the block. This latter difficulty would now appear to have been overcome with the introduction of Xylocaine.

In the writer's hands both subarachnoid block (using various drugs and techniques) and continuous epidural block (using Xylocaine) have proved eminently satisfactory. Even if techniques using regional analgesia are somewhat limited as to scope, for certain operations they appear, at present, to have very definite advantages over Hexathide. These reasons will be explained later.

3. *Controlled Arterial Bleeding.* The technique and apparatus has been adequately described by Hale[13] and Bilsland.[1] The writer has no experience of this technique. The chief difficulty would appear to be the complexity of the apparatus probably requiring an extra operator, apart from the anaesthetist, to work it.

Posture. Almost as important as the use of hypotensive drugs is the use of posture. Every attempt is made to have the operative site uppermost whilst attempting to pool blood in the extremities. Indeed in many of the younger normotensive subjects there will be no fall of blood pressure till adequate posturing has been obtained. For head and neck operations a reverse Trendellenburg or semi-sitting position is adopted. A 15-20° foot-down tilt may be required. This may of course provide an added difficulty for the surgical team, as the average operating table will not sink sufficiently low to compensate for the elevation of the head and neck. If the occasion arises the tilt of the legs can be further increased by extending the hips and back with pillows. This should not be used too enthusiastically, as a bloodless field may be purchased at the expense of a severe post-operative backache. For operations in the prone position adequate conditions can be usually obtained by the jack-knife position with the legs left dependant. The difficulty with the prone position is that there is frequently pressure on the abdomen, which seems to cause some congestion of the epidural veins, bleeding from which may be troublesome during spinal explorations. For the lateral position, tilting plus moderate use of the kidney rest usually produces effective results. Again the kidney rest must be used with care paying due regard to the possibility of post-operative backache.

CLINICAL OBSERVATION OF THE PATIENT

Whilst the clinical management of the hypotensive patient is on the whole relatively easy, there will be a sufficiency of disturbing signs, in many cases to call for absolute alertness throughout every operation. The importance of adequate oxygenation has been stressed. In addition the respiration will provide us with signs of medullary anaemia. Three signs must be carefully noted; they are

1. An increase of rate
2. Tracheal tug
3. Irregularity.

It will be clear that there may be some confusion due to stimuli from the operative site, e.g. during a thyroidectomy. For the reason that deep anaesthesia or the use of muscle relaxants may produce rapid respiration and or trachael tug, the writer has preferred not to use Hexathide products in operations requiring muscular relaxation, e.g. repair of large ventral hernias. Recourse is then made to spinal or epidural analgesia.

The Eyes. With Hexathide the pupil is usually fairly widely dilated—a frightening feature at first.

The Skin. If the circulation is adequate the skin is warm, dry and pink. The latter colour, unfortunately, is lacking in all non-European subjects. Any cyanosis, coldness, a blotchy white and blue colouration is an immediate indication for reversal of the hypotensive state.

Pulse Rate. With Hexathide there is almost invariably a marked tachycardia in resistant subjects, even without the development of hypotension. With high spinal blocks there is often bradycardia—this usually is ascribed to block of the cardiac sympathetic—probably an incorrect explanation, as the bradycardia may often be abolished by elevation of the legs. The more likely explanation is a low venous and possibly right auricular pressure (Bainbridge reflex). Generally speaking a fall of rate below 40 should not be allowed to occur.

Reversal of Hypotensive State. In 5-6% of cases there will be some disturbing sign making the reversal of hypotension advisable. Fortunately this is relatively easily and consistently accomplished by the intravenous administration of Methedrine in doses of 15-30 mg. or dilute infusions of adrenaline 1:250,000 or Neosynephrine 1:50,000. Elevation of the limbs is also of equal importance.

Post-Operative Management. There seems to be some difference of opinion concerning the advisability of immediately returning the blood pressure to a higher level. Shackleton[14] returns the pressure to 100 mm. Hg at the completion of the operation. Enderby[10] on the other hand allows the pressure gradually to return without the use of pressor agents—maintaining that reactionary haemorrhage is less likely to occur with a gradual return of blood pressure. Our practice has been to let recovery

occur spontaneously—no ill effects have so far been noted. After head and neck operations the patient is removed from the operating table to bed, supported on pillows.

INDICATIONS

I. SURGICAL (WITH HAEMORRHAGE OR LARGE WOUNDS)

(*a*) *Radical Mastectomy.* Here seems an indication par excellence for the use of the technique, probably using inhalation anaesthesia and Hexathide.

(*b*) *Sympathectomy* (*Lumbo-dorsal and Lumbar*): *Repair of Incisional Hernia and such like.* Here the regional methods would seem preferable, and in our hands have provided remarkably good conditions. In so far as extensive sympathetic resections have now lost their popularity the method will no doubt in future be limited to repair of large herniae and such like. In this latter connexion this technique has appeared to provide very gratifying conditions both operatively and immediately post-operatively.

(*c*) *Plastic procedures.* Personal experience here is limited; but a major part of Enderby's work appears to have been done in this connexion. For the most part inhalation and intravenous anaesthesia with Hexathide would appear to be a method applicable.

(*d*) *Radical Gland Dissections* (*Cervical and Inguinal*). *Thyroidectomy. Removal of Maxilla and Mandible.* Here fairly extensive experience has shown that the bloodless field is of great value in aiding clean dissection.

II. NEUROSURGICAL

(*a*) *Craniotomy.* Bilsland [1] reports significantly decreased bleeding except from the sinuses. Of equal importance however is the observation that with a hypotensive technique the tension of the brain is much reduced. This indeed may be a method of producing a 'slack' brain and also of avoiding or possibly managing the dreaded onset of acute cerebral oedma.

(*b*) *Laminectomy.* Experience of several cases confirms Enderby's [10] remarks that approach is greatly facilitated but bleeding from epidural veins is no less troublesome. It is not clear at present whether spinal, or inhalation and intravenous techniques are preferable.

RESULTS

This communication is based on 73 cases in which a hypotensive technique was attempted. In 60 cases (80%) an adequate fall of blood pressure and significantly less bleeding ensued. It seems however that there must be a third factor, apart from hypotension and posture, that is at present not understood. This has been noted particularly in abdominal gynaecological and lower abdominal procedures. In different cases given the same low blood pressure and the same posture, in one operating conditions will be practically cadaveric in their bloodlessness, in the other the ooze will be reminiscent of Cyclopropane at its worst.

The question of so-called reactionary haemorrhage naturally looms very large. One says so-called, because in most surgical textbooks this is ascribed to the rise in blood pressure following operation. The only three cases which could fall into this category, in the writer's experience, were all cases in which there was no fall in pressure during the operation. Using the hypotensive technique there have so far been no cases of post-operative haemorrhage. It is obviously too early to state that such is no less or more than usual. This will require careful study over many cases.

CONCLUSION

This communication is intended only to give a review of the scope and possibilities of techniques to reduce operative bleeding. It is clear that it can be of great benefit in certain cases. But it is also equally clear that misapplied, either without due regard to contra-indications or neglect of warning signs during operation, the technique can probably have a higher mortality and morbidity rate than most other commonly used anaesthetic methods.

The method supplies an abundance of physiological problems requiring further investigation. Moreover, careful post-operative observation is still required to substantiate that improved operating conditions are not provided at the cost of increased morbidity.

SUMMARY

1. It is demonstrated that the blood pressure level is not necessarily an index of adequate circulation.

2. Adequate circulation can apparently still be present in the presence of profound hypotensive states.

3. The clinical application of hypotensive states to reduce operative bleeding is discussed.

4. The use of Hexathide and regional analgesia in the production of hypotension is described and the relative merits of each for various operations discussed.

5. The necessity for further study of this technique is emphasized.

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OBSOLESCENT AND DEBATABLE IDEAS IN DERMATOLOGY*

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If we classify obsolescent ideas into superstitious beliefs held by the laity and the profession respectively, it quickly becomes apparent that most popular beliefs originated with us. In Turner's (1726) *Treatise of Diseases Incident to the Skin*—the first dermatological work in the English language of which I know—aetiology is almost confined to a consideration of circulating humours and heated blood, with speculation regarding the role of scorbutic and venereal taints. More than two centuries later our patients still ask us: 'Is it something in my blood?', 'Do you think there is something deficient in my diet?', or 'Doctor, I've always led a clean life, but do you think a blood test would help?'

Only a quarter of a century ago my chief, to whom I demonstrated a case of Schamberg's progressive pigmentary dermatosis, shook his head sceptically and said: '*I* think his blood's overheated'. And up to the present day people still confuse 'scurfy' with 'scurvy' and give plenty of fruit and green vegetables to children suffering from furfuraceous impetigo. The discovery of vitamins has given an old superstition the sanction of science, and I see vitamins taken internally and applied externally for any form of skin disease except, often enough, pellagra.

In Turner's day the infectiousness of skin diseases other than syphilis and leprosy was hardly considered. The discovery of bacteria towards the end of the last century resulted in nearly every disease being considered infective: germs were recovered readily from every lesion and eczema, of course, could hardly be left out. It was credited with its own coccus by no less an authority than Unna (1896). And so to-day skin diseases, especially eczema, are regarded by the public as highly infectious. One of the few exceptions are warts, and the patient who asks what causes them is usually surprised to hear that they are infectious; they had always understood, they tell me, that warts were caused by a deficiency of calcium in the blood.

CALCIUM THERAPY

This brings me to the biggest misunderstanding—I almost said racket—in dermatology. Calcium is being prescribed to-day for an astonishing variety of skin diseases. For warts it is as reasonable as any other form of treatment short of actual destruction; in other words, it acts like any other kind of psychotherapy, and it is a fact that in the majority of children warts can be cured by suggestion. But when it comes to dystrophy of the nails it is surprising how often calcium is prescribed. This mineral is not an essential constituent of horn tissue, and calcium deficiency in man has not been reliably reported as causing visible changes in the nails. Even in those uncommon cases where iron deficiency plays a part, calcium is usually given. In my experience the majority of nail dystrophies are due either to psoriasis or to prolonged immersion in soapy water, and in neither case can the administration of calcium be expected to produce any benefit. I fancy that an unthinking relationship exists between nails and teeth, but only in people's minds. Such phrases as 'fighting tooth and nail' and 'Nature, red in tooth and claw' seem to support this view. And thus the observed relationship between some dental diseases and calcium metabolism has been extended to the nails without any justification.

Calcium therapy in skin diseases goes back, so far as I can find out, to an observation by Almroth Wright (1896) in the last century. He described two cases of urticaria which recovered while calcium chloride was given by mouth. It seems worth while going into some detail about this contribution. According to Wright, urticaria was caused by diminished blood coagulability which led to serous exudation and hence to urticaria. Calcium acted by increasing blood coagulability and hence arrested the trouble. We know now, of course, that this explanation is simply not true, and it says much for Wright's honesty that he reported normal blood coagulability in the first of his two cases. His argument is weakened still further by the statement that he had *produced* urticaria in himself by taking large doses of calcium chloride, which (believe it or not) *diminished* blood coagulability. And, as though to make certain of linking Science and Superstition, he went on to point out that acid fruits diminish blood coagulability by abstracting lime salts from the blood. Those of us who deal with cases of urticaria now know whom to blame for the perpetual harping on oranges, tomatoes and pineapples. Wright's second case can be dismissed summarily: it was an urticaria following the injection of diphtheria antitoxin and cleared up in about the same time as we see with untreated cases. Since then the history of calcium therapy has been a success story of the first magnitude. A simple calculation shows that if all the calcium swallowed and injected were turned into cement it could have built another Maginot Line—and been just as useful. The literature abounds with accounts of the beneficial effects of calcium therapy and with animal experiments demonstrating its action. But when these studies have been repeated by other workers, notably Ramirez (1930), Cohen and Rudolph (1930) and Haxthausen (1948), calcium has been quite inert. The last-named author's investigations in laboratory animals are recent and were carefully performed and controlled: to support them Fex (1948) stated: 'In my hospital patients I have never seen any appreciable benefit from calcium therapy. I wish to proffer my thanks to Professor Haxthausen for having helped to rectify a very common mistake among practitioners, viz. that of giving calcium preparations indiscriminately in various kinds of skin disorders.'

An extension of The Great Calcium Illusion is its use in the condition known as papular urticaria or lichen urticatus. Even the most modern textbooks regard it as *the* variety of ordinary urticaria peculiar to childhood, although it has been shown, e.g. by Cornbleet (1949), that antihistaminic drugs do not influence it. Yet the same author

* An address delivered at a meeting of the Johannesburg Medical Discussion Club on 1 June 1951.

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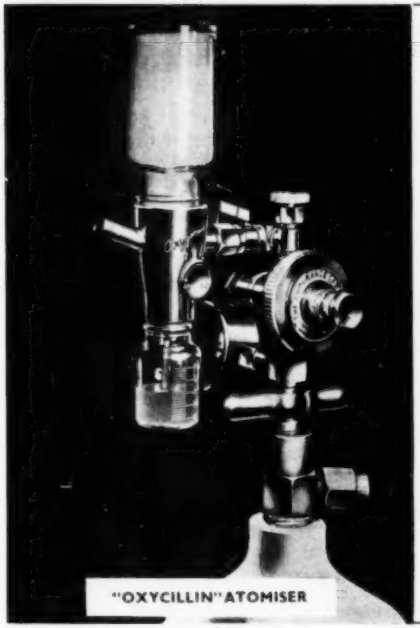

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(1929), exactly 20 years earlier, had claimed considerable benefit in cases of lichen urticatus from the administration of parathyroid extract, by virtue of its influence on calcium metabolism. To-day calcium and Benadryl are still the remedies most frequently prescribed for papular urticaria.

I will not weary you with a full historical account of the condition; it is enough to say that every fashionable cause has in turn been blamed. Thus in 1915 Sequeira is in favour of its being a toxic affection and directs attention to the bowels, with a fine disregard whether constipation or diarrhoea is present. In 1938 Urbach lays great stress on food allergens, and a few years later Becker and Obermayer (1947A) are fairly sure that lichen urticatus is the result of underlying nervous exhaustion. I shall not be surprised to read of adrenocortical failure being blamed any day from now. Yet many years ago Jonathan Hutchinson (MacKenna, 1927) was of opinion that fleas had something to do with the appearance of the lesions; much later Hamburger and Dietrich (1938) showed that in every case a sensitivity to flea- and bed-bug bites could be demonstrated. Such an explanation was far too easy and the cheeky boys were promptly put in their place by Urbach and by Wise and Sulzberger (1938). Shaffer, Spencer and Blank (1948) returned to the attack, only to be reminded by Sulzberger and Baer (1949) that the distinguished teachers of the past would not have made the diagnosis of papular urticaria without considering the possibility of insect bites. Recently Lunsford (1949) has again drawn attention to the same clinical picture produced by fleas in California, and to a generalized papular urticaria the result of an allergic reaction to one or a few bites. My own experience in South Africa supports the views of the heretics: mosquitoes and fleas seem to account for the many cases of papular urticaria that I see, and modern insecticides and repellants promptly cure every case.

A brief reference to Hallam's work (1932) is of interest here. It had long been known that hospitalizing children with lichen urticatus produced relief and that return to their homes was followed by relapse. By careful experimentation with day hospitalization, night hospitalization, use of children's own bedding in hospital and feeding of home-cooked meals in hospital, he deduced that the condition was allergic, connected with home sleeping arrangements and not connected with food factors. It seems hard that this fine work was not crowned with the last and most obvious conclusion.

BALDNESS

Baldness is another topic where ideas are dead but refuse to lie down. Hebra (1866) was, I believe, the first to state that a condition of seborrhoea sicca caused baldness of the male type and since then textbooks have studiously copied his view. Even among the latest of these (e.g. Becker and Obermayer, 1947B) one sees alopecia seborrhoeica given a separate heading; it is stated that it 'differs essentially from the premature type only by the presence of seborrhoeic dermatitis of the scalp, usually apparent in the mild form known as "dandruff"'. Apparently it follows that you have only to cure the dandruff in order to prevent the baldness, and this is indeed what we gather from the authorities; however, they invariably add some such qualification as 'except in those cases who would develop premature alopecia in any case'. In view of the lack of evidence adduced for such a theory in numerical form, it is permissible to doubt whether there is even a grain of truth in this superstition. So far as I know, not a single authority has tested this hundred-year-old hypothesis. Yet we see numbers of bald men who have never suffered from dandruff; others whose dandruff was arrested (possibly by treatment) becoming steadily more bald; and still other men who have suffered from dandruff for a decade or more and who show no signs of baldness.

All available evidence, as distinct from theory, suggests that baldness is a sex-linked, hereditary condition and that it happens to those with the necessary genetic equipment, whether they have dandruff or not. There is only one way to avoid it—castration; for eunuchs do not go bald, and conversely subjects of diseases which produce an excess of androgens tend to show a male type of baldness, even if they are women. Harris (1947) has even shown that baldness occurs more frequently in males who have abundant body hair and less frequently in those who have only a scanty growth of hair on the body. He does not mention whether this latter group suffers from dandruff of the chest. If it were only realized more widely that male baldness is not a disease but as much an inherited characteristic as are blue eyes, there would be less talk of greasy scales, tightly fitting hats and infected hair-brushes.

'ACIDITY' AND SKIN DISEASES

I have mentioned the 'acid fruit' fallacy. It is only a part of the popular idea that 'acidity' in general, or 'acidity' in the blood in particular, are the cause of various skin diseases. Hence alkalies are the obvious remedy, and one still sees 'Mist. pot. cit.' and bicarbonate baths prescribed, even in dermatological departments. I fancy that this fallacy, too, must date back many years, to the days, in fact, before bacteria were discovered. In those days a piece of litmus paper was the latest thing in diagnostic equipment; acids and alkalies fought a ceaseless battle in the patient, like the angels and devils of mediaeval theology, or the cowboys and redskins of more recent times. In those days the hero wore a top hat instead of a Hopalong Cassidy outfit; a spoonful of bicarbonate, and *ping*!, another hydrogen-ion bit the dust.

Curiously enough, the part played by acidity in skin diseases is a different one. Burtenshaw (1948) ably sums up the work of Marchionini and others, and agrees that the acid mantle of the skin surface is its most powerful protection against infection. Those areas which are less acid, for instance the flexures, are proportionately more prone to infection. As Wise and Sulzberger (1938B) remark: 'The logical conclusion in managing many skin diseases is, therefore, not (as so popularly and inanely reiterated) to "alkalinize" but rather to "acidify"—at least as regards the skin surface.'

Before leaving the realm of pure fancy it would be as well to remark that certain other old beliefs have their adherents to-day. I refer to such alleged aetiological factors as constipation, sexual excess, nephritis, and abuse of food or alcohol. These, I fancy, date back to the days when the human organism was a relatively simple one, as yet unprobed by pathologist or biochemist. In

those good old days eating, drinking, reproduction and excretion still summed up the physical side of the human machine, and the cause of disease had to be found among them. Along the same line is the superstition, even now held by some members of our profession, that acne vulgaris in young women is cured by marriage, though I have never seen it stated whether a civil or religious ceremony is required. This belief is easily explained by the facts that most mild cases of acne clear up spontaneously at just the age when girls usually marry, and that sufferers from severe acne often fail to find a husband.

DEBATABLE SUBJECTS

MOLES

Malignant melanoma of the skin must surely rank as the most important, if rarest disease which I have selected for discussion. The accepted view is quite simple: certain moles are potentially malignant; if left alone they may become malignant through trauma or irritation; if interfered with, other than by wide primary excision, they tend to metastasize quickly, with the tragic results that most of us have seen. Matthews (1951) has recently stated: 'The patient may come for treatment not for cosmetic reasons but because the lesion has lately been enlarging or bleeding. In cases of this sort careless manipulation, or even a biopsy, may lead to the grim results which have placed something of a hoodoo on the treatment of moles.' In direct opposition to this, which I shall call the 'classical' belief, is the testimony of dozens of dermatologists who have reported findings in over a thousand cases of pigmented naevus. Becker (1949), for instance, believes that the old idea, that removal of tissue for biopsy encourages metastasis of malignant lesions, is fallacious. In discussion on his paper all participants agreed that there was no harm in taking a biopsy specimen. Becker further stated 'that in practically all instances in which melanoma has followed treatment of a "mole" biopsy of the lesion at the time of treatment would have demonstrated cause for suspicion'. It has been satisfactorily shown that malignant melanomas almost invariably arise from the 'junction' type of pigmented naevus, which has its own naked-eye and histological characteristics. Sachs, MacKee, Schwartz and Parson (1947) state categorically that biopsy of junction naevi is necessary and not contra-indicated. They have never seen malignant melanoma develop as the result of biopsy, nor the degree of malignancy increased. They quote seven other authorities to support the view that there is practically no possibility of disseminating tumour emboli by careful biopsy. Even in larger lesions they advise removal of a small piece for diagnosis; they state further that the junction naevus should be removed—but that a wide excision is not necessary.

How now does this contradiction come about? I think that the answer is given in Matthews' statement: 'The patient comes because the lesion has lately been enlarging or bleeding.' I agree with this, but I do not agree with the corollary, that in cases of this sort careless manipulation, or even a biopsy, may lead to the grim results. Rather would I say that these lesions are the very ones which are already malignant, and have disseminated *before* manipulation or biopsy. After all, what brings a patient for treatment of a pigmented mole? I venture to say that in many cases it is some change in this mole which, after all, has been present for many years; and further that this change is a sign of established malignancy, and not the threat thereof. I have been fortunate enough to see only three such cases in the last five years. One came because the lesion was blacker, one because it was larger, and one because it was bleeding. In all three cases I had immediate wide excision done by a surgeon. They are all dead to-day.

As regards the statement that chronic irritation is responsible for malignancy in pigmented naevi, I again permit myself to doubt. Can chronic irritation account for the precisely similar malignant melanoma of the uveal tract of the eye? If not, why do we stress it in melanoma of the skin? Only, I believe, because being human we like to attribute a cause to all observed phenomena.

DIABETES AND DERMATOLOGY

The part played by diabetes in skin diseases is another subject which requires further investigation. It is usually admitted that monilia infections of the genitalia in women frequently occur with uncontrolled diabetes. When we consider the question of boils and carbuncles, however, we are on less certain ground. It is generally taught that diabetes is one of the important causes predisposing to these conditions, yet in a fair experience of dermatology I can positively remember only one case in which boils drew attention to unrecognized diabetes. I am not concerned here whether this type of sepsis can itself produce transient glycosuria; rather will I confine myself to the available statistics. Let me read an extract from Wiener (1947): 'Furuncles and carbuncles have always been considered common in diabetes. This has been statistically confirmed by Greenwood (1927) who found the incidence among 500 diabetics about twice as high as the general average of the hospital patients (2% compared with 1.2%) . . . Note the use of the word "statistically". In real numbers the series show that 10 of the diabetics and six of the others had boils. The difference is four, and reference to a statistical table shows that a difference of at least 10 is required to give bare significance. The figures given do not suggest the operation of any factor other than pure chance. Thus are we misled by these glib percentages, with their false suggestion of statistical value. Tauber (1933) produced a second comparison of series of 500 cases and found a reversal of these figures, i.e. that the incidence of furuncles and carbuncles was twice as high among non-diabetics! Surely the real value of such figures is to demonstrate that the question is still open, and that yet another of the 'facts' which we were taught and still teach is in reality only a subject for further enquiry.

THE PSYCHOSOMATIC APPROACH

Let us finish now by examining a subject which is given much publicity to-day—psychosomatic dermatology. At the outset I want to make it clear that every thinking dermatologist has recognized that emotional factors play a great part in the development and in the course of certain skin diseases. To survey the literature which has grown up around the subject would require, not only the whole of this paper, but at least a dozen more of

similar length. My remarks on the subject, therefore, must necessarily be eclectic and, I am afraid, biassed.

There is no doubt that certain conditions of the skin have their origin only in the mind. But in a wide variety the emotions may play some part, and there is a regrettable tendency to blame them indiscriminately. I have already quoted a recent textbook pronouncement that underlying nervous exhaustion is the cause of what we now know to be insect bites. In many other dermatoses ignorance of the cause has led to the psyche being blamed. I prefer to regard a psychogenic explanation as the last resort of the diagnostically destitute. The usual approach is to analyse a series of cases and state that a certain percentage suffered from maladjustments, such as lack of parental love, broken homes, poverty, and so on. But it is remarkable how rarely the frequency of such maladjustments is compared with their frequency in comparable samples of normal persons. This was remarked by Cormia (1951A) a few months ago. Even where such normal controls have been investigated psychologically, it is reasonable to doubt whether the same enthusiasm has been shown in 'digging up the dirt' as in those cases being investigated with the avowed object of demonstrating psychosomatic factors.

Neither should we forget the personal factor in psychoanalysis, nor the tendency that exists for the amateur analyst to project his own personality; hence many authorities deplore the clinician's analysing his own patients.

The results of treatment based on the psychosomatic approach do nothing to make one more enthusiastic. Reports of percentages of cases cured by psychiatry alone are difficult to find; when found they are not impressive, and do not compare favourably with the figures we are accustomed to expect with older methods of treatment. Too often the report concerns itself with a few lurid examples, with plenty of emphasis on sex and homicidal tendencies, the same recipe, in fact, which sells the modern 'thriller'. I prefer the latter.

Many authors (e.g. Weiss, 1948) have stressed the importance of excluding organic disease before investigating psychological factors. It is a regrettable fact that those who are weakest in the fields of diagnosis and therapy are often among the strongest proponents of psychosomatic medicine. I fancy that this is in itself a psychological manifestation on our part: 'don't blame yourself; blame the patient'. Let me give an example. A young woman developed a rash of the upper eyelids: it was called 'seborrhoeic dermatitis' (I wish I had time to include this so-called disease among obsolescent ideas) and given a variety of treatments. When, after several months, no improvement took place she was referred for psychiatry. I don't know what maladjustments were discovered, whether she was fond of her father or disliked her father—both, I believe, are of pretty sinister import—but I am sure a good time was had by all. After many more months she recovered, but only when it was found that she was allergic to nail lacquer. Three years later she remains well, except when she tries to wear nail lacquer.

The foregoing are minor points and simply stress the fallibility to which we are all subject. It is when we come to consider the finer details of these theories that we begin to see darkness. There is a condition called chronic neurodermatitis—it has plenty of other names as well—which we are all agreed is psychosomatic. Here are some recent pronouncements concerning it:—

Cormia (1951B): 'Family or childhood maladjustment was exceptional, and neurotic traits were observed in less than half the patients.'

Sneddon (1949): 'These patients have an inborn feeling of inadequacy, a conflict of conscience and ability to sense irritation which the normal person would not.'

Wittkower (1948) gives neurodermatitis as an example of disease due to conflicts over aggressiveness and cleanliness, but Cormia says that such patients in his series were submissive rather than aggressive.

If this sort of contradiction can occur in a disease which all admit to be psychosomatic, what of the numerous other conditions whose psychic origin is uncertain? Urticaria, seborrhoeic dermatitis, psoriasis and eczema are quoted by many authorities as conditions which may arise from emotional causes (Cormia, 1951B; Crew, 1948; Wittkower, 1947, 1948; Sneddon, 1949; Watt, 1947; Klaber, 1947). Yet Sulzberger and Baer, in their capacity as Editors of the *Year Book of Dermatology and Syphilology*, repeatedly warn against too enthusiastic an acceptance of such an aetiology. In one of their abstracts the last sentence reads: 'Whereas such emotional factors should be considered in the aetiology of seborrhoeic dermatitis, there is danger in overrating them'; they add the following editorial note: 'Please read the last sentence carefully and repeatedly' (Sulzberger and Baer, 1947). The most recent example of factual evidence in this field concerns the people of Greece during the German occupation from 1941 to 1944. The incidence of various dermatoses was noted by Doucas (1950) and a fair comment on his findings is that of Sulzberger and Baer (1950): 'It is noteworthy that during these times of incredible suffering and strain on the Greek people there was no increase in urticaria, eczema, psoriasis, seborrhoeic dermatitis and other dermatoses in which emotional factors are considered to play an important part by some observers.'

We have seen, then, that there is a lack of unanimity among experts concerning the precise mechanisms by which so-called neurodermatoses are activated. Perhaps there would be less confusion if proper psychiatrists tackled the job instead of enthusiastic amateurs. This branch of Medicine must suffer from an intrinsic lack of accuracy and to those of us who like to reduce our data to numbers, with which we can calculate, the methods of psychosomatic medicine must appear nebulous. A jargon has grown up, compared with which the derided titles of skin diseases are virtually Basic English. One naturally suspects a contribution which gives one the feeling that plain English is deliberately avoided. This tendency seems to be linked with that of using English words in a wrong sense, and of making more than the usual number of spelling mistakes. Thus Rogerson (1947) uses the word 'subsume' where 'include' is meant; had he consulted a dictionary he would not have used 'subsume' in a sense exactly opposite to that which he intended. Again, Cormia (1951B) perpetrates the following: '. . . compulsive-obsessional states were occasionally noted, while in one the setting was one of overweening depression'. My dictionary tells me that 'overweening' means 'arrogant, presumptuous, conceited, self-confident';

I have not discovered how a depression can be any of these. But perhaps I am of the obsessional-compulsive type and the strong super-ego reaction to my emotions makes me a perfectionist who likes to understand what he is reading.*

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* This sentence roughly reproduces a statement in one of the 'scientific' articles mentioned in this paper.

ASSOCIATION NEWS : VERENIGINGSNUUS

HOSPITAL ADMINISTRATORS' GROUP (MEDICAL ASSOCIATION OF SOUTH AFRICA)

With the appointment of a number of full-time Medical Superintendents of Hospitals throughout the Union, it would seem appropriate to draw the attention of the practitioners who have been appointed to these posts to the desirability of joining the Hospital Administrators' Group within the Association. The objects of this Group, as set out in its constitution, are:—

(a) To promote the practice of Hospital Administration.

(b) To define and establish relationship amongst Hospital Administrators and hospitals, public and private institutions, government authorities, the medical profession generally and the public.

(c) To promote the professional and legitimate interests of Hospital Administrators.

Meetings are held from time to time, generally in connexion with the Association's Annual Scientific Meeting.

Membership is open to all registered medical practitioners who are members of the Medical Association of South Africa, provided that their professional practice is confined to Hospital Administraton. The present membership of the Group is 36.

The Honorary Secretary of the Group is Dr. H. Moross, c/o Tara Hospital, Johannesburg, to whom applications for membership may be made.

REVIEWS OF BOOKS

SURGICAL NURSING

Surgical Nursing and After-Treatment (Tenth Edition). By H. C. Rutherford Darling, M.D., M.S. (Lond.), F.R.C.S. (Eng.), F.R.F.P.S. (Glas.) and T. Edward Wilson, M.D., M.S., M.Sc. (Melb.), F.R.C.S. (Eng.), F.R.C.S. (Edin), F.A.C.S., F.R.A.C.S., M.R.A.C.P. (Pp. 630 + ix, with 188 illustrations. 16s.) London: J. & A. Churchill, Limited. 1951.

Contents: 1. General Surgical Nursing. 2. Regional Surgical Nursing. Specimen Examination Papers. Appendix. Index.

It was a great pleasure a few years ago to welcome the ninth edition of this book and many advances have been made in the science of Surgery since that time.

This tenth edition incorporates the changes which have taken place and while many chapters have been re-written and added to, the whole text has been revised to bring it entirely up to date.

The book was written primarily for Australian nurses, but it will be found to be a usefui textbook of Surgery for nurses elsewhere.

BRONCHIAL ASTHMA

Bronchial Asthma: Its Relation to Upper Respiratory Tract Infection. By R. J. Whiteman, M.B., Ch.M., F.R.A.C.S. (Pp. 184 + xi. 15s.) London: H. K. Lewis & Co. Ltd. 1951.

Contents: 1. Nasal Catarrh. 2. Treatment of Nasal Catarrh. 3. Asthma and its Accompanying Symptoms. 4. Treatment of Asthma. 5. Special Investigation into the Efficacy of the Treatment. 6. Paroxysmal Sneezing. 7. Asthma in Childhood. 8. Case Histories. Index.

On the assumption that 'upper respiratory tract infection is

the most important underlying factor in bronchial asthma and hay fever, and that the elimination of chronic nasal catarrh is the first and most important indication, and all that is required in the great majority of all cases of hay fever and asthma', a special clinic for the treatment of asthma was opened in Sydney in 1937.

In this book Mr. Whiteman describes the work of this clinic, and the results achieved over a period of 10 years.

The book reads easily, in spite of a tendency on the part of the author to unnecessary repetition, and it can be recommended to all general practitioners, physicians and otorhinolaryngologists.

Although for a variety of reasons the methods advocated by the author for the treatment of nasal catarrh would find favour with few practitioners, the results as shown by detailed case histories are impressive to a degree, and give much food for thought.

However controversial and contentious the chapters on the treatment of asthma are, the results obtained over a period of years have certainly justified the establishment of the special clinic, and fully warranted the methods employed.

THE PRACTITIONER

The Practitioner, Vol. 167, July 1951. (Pp. 1-102 + lxiv. £2 2s. per year or 4s. ea.). London: The Practitioner.

Contents: 1. The Month. 2. The Present Status of the Cancer Problem. 3. Malignant Disease in Childhood. 4. The Surgical Treatment of Cancer. 5. The Radiotherapy of Cancer. 6. The Chemotherapy of Cancer. 7. The Treatment of Advanced Cancer. 8. Surface Active Agents in Dermatology. 9. The Morning after the Night before. 10. The Mechanism of Telepathy. 11. Current Therapeutics. XLIII: The Clinical Use of Aureomycin. 12. Revision Corner. 13. Notes and Queries. 14. Practical Notes. 15. Reviews of Books. 16. Notes and Preparations. 17. The Practitioner: 50 Years Ago.

ENDOCRINOLOGY

L'Année Endocrinologique. By M. Albeaux-Fernet, L. Bellot, P. Bréant J. Deribreux, M. Gélinet, Ch. Zérah. (Pp. 168. Fr. 5.20.) Paris: Masson et Cie. 1951.

For those familiar with the French language, this annual review should be of considerable interest and assistance.

As is to be expected, Cortisone and ACTH are the subject of very full report.

CORRESPONDENCE

THE STUDY OF GROUP EVALUATIONS IN MEDICINE

To the Editor: There are many problems of aetiological research which can only be elucidated by the study over long periods of the socio-biological reactions of the various racial groups in this country. As the trend for examining the differences between these groups develops in regard to mortality and morbidity in relation to environment, the greater will be the need for accurate methods in this comparatively new branch of science.

The scientific evaluation of group attributes was not possible before 1899 when Karl Pearson devised the χ^2 index of dispersion and it is only within the last 25 years that R. A. Fisher's monumental work on factorial experiments has simplified the problems of the assessment of the effect of multiple variables. There is no reason why these great advances which were initiated in the agricultural sciences cannot be applied to medicine. The techniques developed for small sample evaluations have been applied over and over again in the testing of new drugs and other therapeutic measures. Important group surveys have been carried out in the Department of Social Medicine at Oxford; but in South Africa we are greatly hampered by the lack of reliable statistics, both in regard to morbidities and mortalities, which renders research on populations most difficult.

In this article it is proposed to deal with the broader aspects and the pitfalls in evaluating the attributes and measurement of data pertaining to groups.

The most important aspect of all such research is to define the group. A hospital sample is a selected and biassed group and although attempts are made to draw inferences from such samples to the general population, such inferences are fallacious and misleading.

In evaluating aggregates, groups or communities it is essential to observe the prime rule governing such assessments, viz.—'That from a random sample one can draw inferences and set limits to the accuracy of these inferences in regard to the population from which the sample was drawn.' One sees the converse to this rule so often in medical literature. 'From a biassed sample one can draw many inferences and come to many wrong conclusions.'

For instance, compiling an abortion rate from the number of abortions occurring in the wards of a hospital and applying such a rate to the general population is an unscientific fiction because, apart from the bias in the sample, neither the numerators nor the denominators can be correct. Another fallacy is to apply the results of hospital post-mortem findings to the incidence in the living population. This has been done repeatedly in trying to arrive at the incidence of the various types of syphilis in the Bantu. However, if we can assume that the Bantu with general paralysis of the insane, or cardiovascular syphilis, is as nimble of foot with the same co-ordination as his normal counterpart, then, a post-mortem sample of those killed in road accidents has an element of randomness from which true inferences may be drawn.

Again, it does not follow that inferences from one population group refer to another. One can hardly pick up a paper on venereal diseases without finding some reference to the ubiquitous Bruusgaard[1] who assesses the various types of syphilis as a certain percentage. Now, Bruusgaard in doing such an analysis and giving the results as a bald percentage, demonstrates a complete lack of knowledge of the elements of group evaluations. By quoting such figures and applying them to the Bantu population, which we know differs from the European in its reaction to treponemata, we can be certain that such figures will be incorrect.

The more general (heterogeneous) the population is the less accurate the inference. By stratification of the population we can increase the accuracy of our estimates. In aetiological research this method of stratification can identify the causative agent. Such investigations were carried out into the relation of the aromatic amine dyes to carcinoma of the bladder.[2] The incidence of this disease in the population of a province was found to be 0.02%, slightly higher than the usual value but within the limits of random probability. The investigation was carried further and it was found that in a local industrial area the figures were 0.1%. Further stratification revealed an incidence of 5% in one industrial plant. At the focal point of the disease, 90% of the workers of a section of this plant were found to be suffering or to have died from carcinoma of the bladder due to an industrial process, the hazards of which were unknown.

Comparing two groups—a control group and another under treatment is an easier procedure; but in evaluating treatments, especially if the drug is in short supply, we must distinguish between the humanitarian motives in using the drug only in the severest cases and the scientific method of random sampling. We often find a statistical analysis proving the worth or otherwise of a drug without any clear account of the selection of the cases.

The Normal. The normal, in regard to the individual, only exists as an entity in relation to the group.

The interpretation of normal values as they affect the individual are beset with difficulties. 'Poliocyte'[3] has so aptly illustrated the pitfalls of the unintelligent use of the so-called normal standards in haematology. The Editorial in this *Journal*[4] further stresses the difficulties and dangers of interpreting blood pressure readings. The late E. C. Smith of Lagos had never seen a normal African liver. In malignant malnutrition severe fatty changes occur in the liver, but there is very little evidence to suggest that liver function is impaired.[5] It is clear that the pathological abnormal unrelated to function is misleading.

In assessing the normal values in biology we are apt to adopt a mechanistic attitude which does not take sufficient cognizance of individual function and adaption. The variation of the breaking strain of a piece of steel is limited only by two factors: the variability of the sample and the error of measurement. In biology the sample variations are wide and

are influenced by complex functional activities and adaptive mechanisms which can nullify abnormal functions.

It is often stated that the normal is not the average or the mean [6] but, if one can express it thus, the average value must be the 'most' normal value of the range of normalcy. The anomaly of the mean is that it is a group value composed of individuals, yet no individual behaves or reacts as this normal average. For instance,[7] the more observations that are taken of infants' weight measurements, the smoother the graph. The so-called average infant is, in fact, a paragon who never has diarrhoea, bronchitis or teething troubles to cause a loss of weight.

It cannot be stressed sufficiently that the main use of such graphs is for group comparisons and not for individual estimations. Nutritionists and pediatricians vie with each other in trying to bring infants up to some so-called normal weight level. The average child in Britain is now heavier and taller than the child of 1910. No one has been able to explain the significance of this fact. Until proof is available that the fatter and taller have more stamina or more intellect than the thin and wiry, this form of assessment can be judged on an aesthetic plane only.

The compilation of such graphs from thousands of observations of a particular racial group makes it, in the first place, specific (see above) for the population examined. Secondly, the commencement will reflect the average birth weight; but any baby starting off below the average in this statistical competition, knowing nothing of the complexities of the computation of the mean, makes progress or otherwise according to his *own tempo*, but not the tempo of the average. When graphs are compiled, not of average weights but of the *relative* gains in weight taking into account birth weight, race, heredity, diet, etc., we will have a better understanding of the physical development of children.

The Problem in South Africa. We have two or more racial groups and mixtures of these in social and biological '*apartheid*' leading different lives, eating different foods, with different racial backgrounds, having only the air and the earth in common and reacting as differently as the specimens of wheat, in Fisher's experiments, to the influences imposed upon them, in short, an experiment in human reactions already set out. Apart from the formidable epidemic diseases, we have only the most meagre data for such research which cannot originate from the 'already' sick in hospitals. It must begin with man in his living environment, in his family and his social group; for man is not an animate object under a counterpane, to be prodded, diagnosed, treated, discharged, recorded and filed away in a cabinet; but a social being who, even if he renounces society, cannot escape from the influences of society or of his environment. His health is as important as his sickness and to understand the whole man we need a unity of organization embracing all the present isolated institutions devoted to his care and welfare.

I wish to thank Dr. Gale, Secretary for Health, for his permission to publish this communication.

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S. B. Sachs, M.B., B.Ch.
Evaton Health Centre,
Evaton.
6 September 1951.

ULTRASONIC WAVES AND TREATMENT

To the Editor: I have been most interested in your Editorial of 22 September 1951 on ultrasonic therapy but venture to suggest that the writer has done a little less than justice to this new branch of physiotherapy.

1. When emphasizing the danger of ultrasonic therapy you do not allow for the well-established fact that the operator is protected from damage in any of the available sets and, what is even more important, the ultrasonic waves provide an automatic limiting factor in that they produce subjective sensations of pain when the limit of tolerance is approached. Also modern dosimetric developments permit not only the estimation of the amount of energy applied but also the amount absorbed by the tissues. This is a development of more than academic interest and one which has not been attained in other branches of physiotherapy. Quite apart from this inherent element of safety it would surely be unwise to reject therapy simply because in careless hands it may prove dangerous or because excessive doses may evoke unwelcome reactions. From this point of view X-ray therapy and many other forms of therapy would have had to be discarded before they were developed.

2. It is incorrect to imply that ultrasonic therapy has no specific action. Certain biological and physico-chemical effects are not produced by any other form of energy used in physiotherapy and the same applies to therapeutic effects. This applies particularly to the use of pulsating ultrasonics in which the thermogenic element is virtually eliminated and only other specific effects of the waves (e.g. the mechanical action and thixotropic effect) are retained. These specific effects are well established.

3. It is perhaps not generally known that a very extensive literature concerning the use of ultrasonic therapy has developed and has been reviewed both by individual writers and in the form of congress reports (*See* A. W. Bauer, Brit. J. Phys. Med.). The modern writings, while quite critical of unfounded claims made in the early stages of ultrasonic therapy, have established that it has specific and pronounced effects which secure it a definite place in therapy.

Albert W. Bauer.
London, W.1.
20 October 1951.

PRESCRIPTION AND DISPENSING

To the Editor: The chemists don't seem to realize that doctors are fully trained and licensed to dispense all medicines, etc., for their own patients.

As there is no State Medicine in South Africa dispensing is not a monopoly of the chemists. They are employed by the doctors only when the latter have neither the time nor, perhaps, the inclination to give this service themselves.

The 'pious clause' stating that 'there should be legislation to *preserve* for chemists the sole right to *prescribe* medicines' doesn't make sense. The chemists have never had the sole right of dispensing much less prescribing. Only doctors should be allowed to prescribe for and treat patients; chemists may dispense prescriptions at the doctors' discretion.

The patient-doctor point of view doesn't seem to matter in the proposed Chemists' Utopia. Is this an example of future medical care in South Africa? (*vide* 'pious clause'). Patient consults doctor. Doctor diagnoses case and sends patient to chemist. Chemist 'prescribes' and dispenses. Doctor then signs death certificate.

A pretty grim outlook for every one except the chemist.

Further, to compare the sale of medicines by the 'little shops' of South Africa with that of Great Britain is ludicrous when one considers the vast distances over bad roads which a great many country dwellers must travel to reach a doctor or chemist.

As long as the drugs sold by these little shops are non-toxic, they are often of great help in the immediate service to the patient.

After all, the patient is of primary importance—not the chemist.

Illness is not confined to 'business hours' nor does it recognize public holidays or long week-ends.

'*Dispensing Doctor.*'

20 October 1951.

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2. As in the case of all new therapies, great care must be exercised in patients suffering from Cardiovascular diseases; patients having less than 85% of normal Liver function; chronic or acute Nephritis; Epilepsy; Diabetes mellitus; Asthma and Pregnancy.
3. "ANTABUS" should not be administered to patients who have been given Paraldehyde as it may be metabolised through an Acetaldehyde stage. Similarly Paraldehyde should not be administered to "ANTABUS"-treated patients.
4. The patients desire to stop treatment should be discouraged until such time as it is confidently felt that social readjustment has been effected. The aid of social workers such as "Alcoholics Anonymous" is, in many cases, of great importance.
5. "ANTABUS" is a relatively safe drug provided a proper physical, psychiatric and social evaluation of the patient is made before treatment is commenced.
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* *This experimental finding (F. Obstet. Gynaec. Brit. Emp. Vol. 40. No. 6) has been confirmed in obstetric practice.*

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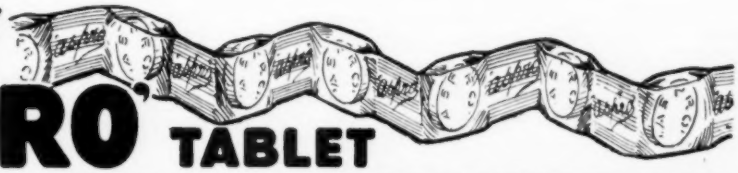

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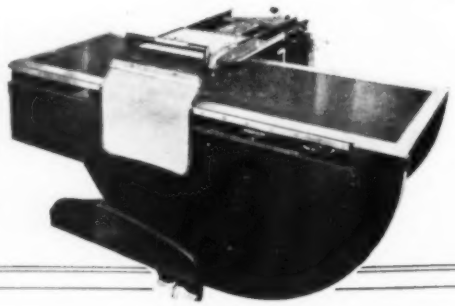

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Die Mediese Vereniging van Suid-Afrika

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(821) Eastern Province hospital town. Gross cash receipts £2,200. Premium required £850 which includes drugs, furniture and instruments valued at £350. Mainly non-European at present but with definite scope for future.

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(644) Durban Central. Mainly Indian and Native cash practice. Average annual gross income £1,235. Premium of £500 required for goodwill, inclusive of furniture and fittings and drugs. Terms may be arranged.

(836) Oostelike Provinsie. Dorp met moontlikheid van hospitaaldienste binnekort. Medisyne word aangemaak. Jaarlikse ontvangste gemiddeld £2,266. Twee aanstellings. Huis en apteek teen £12 p.m. te huur. Premie van £1,500 sluit ligte installasie in. Geen opposisie nie.

(805) Transkei. Native and D.S. practice near large town. Average annual receipts £3,375. House for sale £3,250. Terms possible. Bond available.

(848) Cape Town, Southern Suburbs. Solus practice. Average annual receipts £2,088. Premium and terms open to discussion. Excellent opportunity.

(860) Noordelike Kaapprovinsie. Vooruitstrewende aangename hospitaaldorp met uitstekende skole. Venootskapspraktyk met kontant inkomste van £6,459 in afgelope jaar. Twee aanstellings. Uitstekende geleentheid vir snykunde.

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(811) Partnership share in Cape or Natal in predominantly English-speaking practice with min. net. income £2,500 p.a.

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(I 023) Heavy based Irrigator stand, height adjustable, complete with glass flask and hook to carry vacolitre flasks. £7.

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(L/V139) Free State mining town. From 27 November 1951 to 1 January 1952. £3 3s. p.d. plus all found. Car not essential.

Provinsiale Administrasie van die kaap die Goeie Hoop

UNIVERSITEIT VAN KAAPSTAD: GESAMENTLIKE MEDIESE PERSONEEL

1. Aansoeke word ingewag van geregistreerde geneeshere vir aanstelling in 'n pos van Geneesheer, Graad E, met salaris teen £1,600 per jaar, in die Departement van Narkose in die gesamentlike mediese personeel vir die Groote Schuur-hospitaal en ander opleidingshospitale in die Skiereiland.

2. Benewens die salaris soos aangedui is 'n lewenskostetoelae betaalbaar teen tariewe wat van tyd tot tyd deur die Administrateur vasgestel word. (Huidige tarief £256 per jaar vir getroude en £80 per jaar vir ongetroude persone.)

3. Die volgende diensvoorwaardes is van toepassing op die aanstelling:—

(a) Die aanstelling is ingevolge en onderworpe aan die bepalings van Ordonnansie nr. 19 van 1941, soos gewysig, en die regulasies daarkragtens opgestel.

(b) Van die gesamentlike mediese personeel word vereis om die Provinsiale Administrasie van die Kaap die Goeie Hoop en die Universiteit van Kaapstad gesamentlik te dien.

(c) Die geslaagde kandidaat, wat nie reeds in die hospitaalraadsdiens is nie, moet bevredigende geboorte- en gesondheidsertifikate indien.

4. Kandidate moet minstens drie jaar ondervinding na registrasie as 'n spesialis in narkose hê.

5. Aansoek moet gedoen word op die voorgeskrewe vorm (Staf 23) wat verkrygbaar is by die Direkteur van Hospitaaldienste, Posbus 2060, Provinsiale Gebou, Waalstraat, Kaapstad, of by die Takverteenwoordigers van die Hospitaaldepartement Kaapstad (Posbus 1487), Port Elizabeth (Posbus 80), Oos-Londen (Posbus 13), Kimberley (Posbus 618) en Umtata (Posbus 202), of by die Mediese Superintendent van enige provinsiale hospitaal of by die sekretaris van enige skoolraad in die Kaapprovinsie.

6. Die ingevulde aansoekvorms moet gerig word aan die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, en moet hom nie later as 30 November 1951 bereik nie. Kandidate moet die vroegste datum meld waarop hulle diens kan aanvaar. (Y 267932)

City of Johannesburg

VACANCY

Applications are invited from Europeans for the following vacant position in the City Health Department:—

Grade 6 (£1,332—48—£1,428 per annum): Assistant Medical Officer of Health.

In addition to the basic salary, a cost-of-living allowance is paid in accordance with the Council's resolution of 25 August 1942, as amended, at present £22 5s. 10d. per month.

The qualifications and conditions of appointment are as contained in the Standard of Education Report adopted by the Council on 26 May 1931, and as amended on 8 July 1938 and 30 March 1943.

Applicants must be registered practitioners, and should possess, in addition, a recognized diploma in Public Health or State Medicine.

The successful applicant will be required to undergo a medical examination and become a member of the Council's Pension Fund. Pension rights between local authorities in the Transvaal are freely transferable, in terms of the Superannuation Ordinance, and reciprocal arrangements exist between the Johannesburg Municipality and other local authorities outside the Transvaal.

Canvassing for appointment in the gift of the Council is strictly prohibited. Proof thereof will disqualify the candidate for appointment.

Applications in the candidates' own handwriting on special forms to be obtained from the Central Staff Office, Room 223, Municipal Offices, must be placed in the box in Room 223, Municipal Offices, or be posted to reach the undersigned at P.O. Box 1049, Johannesburg, not later than 4 p.m. on 30 November 1951.

Brian Porter
Town Clerk

A 1981/508
A.D. 417

Provincial Administration of the Cape of Good Hope

UNIVERSITY OF CAPE TOWN: JOINT MEDICAL STAFF

1. Applications are invited from registered medical practitioners for appointment to a post of medical practitioner, grade E, with salary at the rate of £1,600 per annum in the Department of Anaesthetics on the Joint Medical Staff for the Groote Schuur Hospital and other teaching hospitals in the Cape Peninsula.

2. In addition to the salary indicated, a cost-of-living allowance at the rates prescribed from time to time by the Administrator, is payable. (Present rate is £256 per annum for married and £80 per annum for single persons.)

3. The following conditions of service will apply to the appointment:—

(a) The appointment will be in terms of, and subject to, the provisions of Ordinance No. 19 of 1941, as amended, and the regulations framed thereunder.

(b) The Joint Medical Staff will be required to serve jointly the Provincial Administration of the Cape of Good Hope and the University of Cape Town.

(c) The successful candidate, if not already in the Hospital Board Service, will be required to submit satisfactory birth and health certificates.

4. Candidates must have not less than three years' experience after registration as a specialist in anaesthetics.

5. Application must be made on the prescribed form (Staff 23) which is obtainable from the Director of Hospital Services, P.O. Box 2060, Provincial Building, Wale Street, Cape Town, or from the Branch Representatives of the Hospitals Department, Cape Town (P.O. Box 1487), Port Elizabeth (P.O. Box 80), East London (P.O. Box 13), Kimberley (P.O. Box 618) and Umtata (P.O. Box 202), or from the Medical Superintendent of any Provincial Hospital or Secretary of any School Board in the Cape Province.

6. The completed application forms must be addressed to the Director of Hospital Services, P.O. Box 2060, Cape Town, and must reach him not later than 30 November 1951. Candidates must state the earliest date on which they can assume duty. (Y 267932)

Public Service Commission

VACANCIES IN THE PUBLIC SERVICE

1. The attention of medical practitioners, registered with the South African Medical and Dental Council, is drawn to an advertisement appearing in the *Government* and *Provincial Gazette* of this week, inviting applications for the undermentioned posts:—

Post	*Department/ Administration*	*Salary Scale*
Medical Inspector of Schools	South West Africa Administration	£900×40—1,100 ×50—1,200
District Surgeon	Health (Durban and Bloemfontein)	£960×40—1,120
Medical Officer	Health (Pretoria)	£960×40—1,120
District Surgeon	Health (Nylstroom)	£720×30—900 ×40—1,020
Assistant Pathologist	Health (Durban and Cape Town)	£780×30—900

2. In addition to salary a cost-of-living allowance at the rate of £256 per annum (married) and £80 per annum (single), is payable at present.

3. It is emphasized that full and detailed particulars of qualifications and previous experience (including military service) must be furnished, but original certificates and testimonials should not be submitted. Application forms (Z.83 and P.S.C. 8 (*a*)) are obtainable from the Secretary, Public Service Commission, Pretoria, to whom filled-in forms must be addressed.

4. The closing date for the receipt of applications is 8 December 1951.

(31982)

Vacant District Surgeoncies

Applications for the undermentioned district surgeoncies, accompanied by full particulars as to date and country of birth, qualifications, experience and previous and present appointments of the applicants and the earliest date on which they can assume duty, if appointed should reach the Secretary for Health, P.O. Box 386, Pretoria, not later than 5 December 1951. Testimonials (copies) may be submitted, but the Minister of Health wishes it to be known that any candidate will be regarded as disqualified who directly or indirectly canvasses for appointment.

The appointments are on a part-time basis and private practice is not precluded.

Applicants should state whether they have a knowledge of both official languages, also whether they are competent to diagnose leprosy and venereal disease and to use the modern intravenous and other therapeutic technique in the treatment of venereal disease. Applicants should also state whether they have any experience as a medical officer of health or in any similar capacity. If more than one post is applied for, a separate application should be submitted in respect of each.

Place	*Salary per Annum*	*Drug Allowance per Annum*
Cape Province	£	£
Stanford (Caledon)	150	20
Britstown	300	45
Bonnievale	100	10
Calvinia	210	45
Indwe	175	20
Darling (Malmesbury)	150	15
Orange Free State		
Verkeerdevlei	140	25
Warden	250	40
Transvaal		
Alldays (Zoutpansberg)	350	25
Natal		
New Hanover	450	20

The salaries cover all ordinary and routine services but travelling allowance of 1s. per mile for all mileage travelled outside a radius of three miles from headquarters, night detention at 15s. and supplementary fees for certain other services will be payable. Also fees for attendance at courts and inquests in accordance with the tariff of the Department of Justice.

Forms of application and copy of draft agreement will be furnished on application.

(31953)

Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT

Applications are invited from registered medical practitioners for the following post at the Victoria Hospital, Wynberg:

Honorary Physical Medicine Consultant.

The appointment will be for five years, but may be terminated before the end of that period if and when the Medical Staffing of the Hospitals is organized.

Applications containing particulars of age, qualifications, experience, etc., with copies of recent testimonials should be forwarded to the undersigned by noon, on Friday, 15 December 1951.

L. Welham
Branch Representative

Hospitals Department
Industry Building
58 Loop Street
Cape Town

(4746)

Specialist Anaesthetist

Assistant with view to partnership in flourishing practice. Good prospects. State age, experience, etc., to 'A. I. W.', P.O. Box 643, Cape Town.

Vakante Poste vir Distriksgeneeshere

Aansoeke om ondergenoemde poste van distrikgeneeshere, met vermelding van datum en land van geboorte, kwalifikasies, ondervinding, vorige en teenswoordige betrekkings aangestel, word ingewag deur die Sekretaris van Gesondheid, Posbus 386, Pretoria, en moet hom voor of op 5 Desember 1951, gereik. Getuigskrifte (afskrifte) kan gestuur word, maar die Minister van Gesondheid wil dit goed laat verstaan dat 'n kandidaat as gediskwalifiseer beskou sal word as hy regstreeks of onregstreeks steun vir sy benoeming werf.

Die aanstelling is deeltyds en private praktyk word toegelaat.

Applikante moet ook vermeld of hulle albei amptelike tale ken, asook of hulle melaatsheid en veneriese siektes kan diagnoseer, en die moderne binneaarse en ander geneeskundige metodes by die behandeling van veneriese siektes kan toepas.

Applikante moet ook vermeld of hulle ondervinding as mediese gesondheidsbeampte of in 'n soortgelyke hodanigheid gehad het. As om meer as een pos aansoek gedoen word moet 'n afsonderlike aansoek ten opsigte van elkeen ingedien word.

Plek	*Salaris per Jaar*	*Toelae vir Medisyne per Jaar*
Kaapland	£	£
Stanford (Caledon)	150	20
Britstown	300	45
Bonnievale	100	10
Calvinia	210	45
Indwe	175	20
Darling (Malmesbury)	150	15
Oranje-Vrystaat		
Verkeerdevlei	140	25
Warden	250	40
Transvaal		
Alldays (Zoutpansberg)	350	25
Natal		
New Hanover	450	20

Die salarisse dek alle gewone en roetine-dienste dog reistoelae teen 1s. per myl vir alle afstande wat buite 'n omtrek van drie myl vanaf die standplaas afgelê word, nagverblyf teen 15s. en bykomende vergoeding vir sekere ander dienste word betaal, asook gelde vir bywoning van hofsittings en geregtelike lykskouings ooreenkomstig die skaal van die Departement van Justisie.

Aansoekvorms en kopië van kontrakvorms word op aansoek verstrek.

(31953)

South African Manganese Limited

FULL-TIME MEDICAL OFFICER

FOR POSTMASBURG AREA

Applications for the above post are invited from registered general practitioners.

Applications, on the prescribed form, must reach the undersigned by not later than noon, on 19 December 1951.

Application forms, together with full particulars regarding the post, will be forwarded to any *bona fide* applicant on receipt of a written request.

African Metals Corporation Limited
Secretaries

P.O. Box 8186
Johannesburg

(O. 854)

Assistantship Required

Young married Jewish doctor seeks assistantship or assistantship with view to partnership in Johannesburg or Reef. Has had experience in large general practice, experienced in anaesthetics and has worked in specialized chest hospital. Own car. Available immediately. Write to 'A. I. V.', P.O. Box 643, Cape Town.

South African Railways and Harbours Sick Fund

APPOINTMENT OF CONSULTING PHYSICIAN: PORT ELIZABETH

Applications are invited from registered specialists for the position of consulting physician to the Fund at Port Elizabeth, at a salary of £1,101 per annum, plus the fees and allowances prescribed by the Regulations of the Sick Fund, and with the right of private practice.

The salary will be subject to adjustment in accordance with the census of members to be taken on 1 April of each year.

The appointment will be made in terms of the Regulations of the Fund and will be subject to termination on four months' notice being given by either side.

The duties will comprise examination and advice in regard to treatment of all cases referred to him by the medical officers of the Fund, the administering of artificial pneumothorax to tuberculosis out-patients, as well as any necessary electro-cardiograms, blood counts, etc.

The consulting physician will be required to see cases at his consulting rooms, in the various hospitals and/or nursing homes in Port Elizabeth and at members' residence when in the opinion of the medical officers concerned this is unavoidable.

The successful applicant will be required to reside at Port Elizabeth, to take up the appointment with effect from a date to be arranged, and to carry out his duties in accordance with the Regulations of the Fund.

Applications should reach the District Secretary, Cape Midland District Sick Fund Board, 116 Mutual Arcade, Port Elizabeth, not later than 21 December 1951, and should state the following:

1. Applicant's full name.
2. Qualifications (where and when obtained).
3. Experience (where and when obtained).
4. Date of birth.
5. Country of birth.
6. Married or single.
7. Whether fully bilingual.
8. Whether South African citizen.
9. What Government appointment, if any, is held.

Canvassing by or on behalf of any applicant is liable to disqualify such applicant.

Any further particulars required may be obtained from the District Secretary at the above address on application.

P. J. Klem
General Secretary

Johannesburg
17 November 1951 (19)

Locum Available: Salisbury, Southern Rhodesia

Registered medical practitioner visiting Salisbury, seeks position as locum or assistant, approximately 18 December to 5 January. Own car available. Bilingual. Write to 'A. J. A.', P.O. Box 643, Cape Town.

Divisional Council of Montagu

PART-TIME MEDICAL OFFICER OF HEALTH

Applications are invited for the post of part-time Medical Officer of Health at an inclusive salary of £120 per annum.

Applicants must furnish full details of qualifications. Services to commence on 1 January 1952.

Copies of the Memorandum of Agreement covering the duties and conditions of appointment can be obtained from the undersigned.

Applications in sealed envelopes marked 'M.O.H.' must reach the undersigned not later than Saturday, 24 November 1951.

Canvassing of Councillors will be a disqualification.

Divisional Council Office
P.O. Box 36
Montagu
12 October 1951

J. P. le Grange
Secretary

Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT

ELECTION OF MEDICAL COMMITTEES

The attention of registered medical practitioners is drawn to the Regulations relating to the election, powers and functions of Medical Committees of Provincial Hospitals, framed in terms of sections 33 and 52 of Ordinance No. 18 of 1946, as amended.

The election of Medical Committees for the following institutions will take place on a date to be fixed in March 1952:—

Groote Schuur Hospital.
Somerset Hospital.
Woodstock Hospital.
Rondebosch and Mowbray Hospital.
Victoria Hospital, Wynberg.
False Bay Hospital, Simon's Town.
Peninsula Maternity Hospital. } Joint
Mowbray Maternity Hospital. } Medical
Maternity Section, Somerset Hospital. } Committee.
Lady Michaelis Orthopaedic Home, Plumstead.
Princess Alice Home of Recovery, Retreat.
Cape Town Free Dispensary.
Conradie Home, Pinelands.

Every registered medical practitioner who has been in active practice for at least two years in the areas normally served by the above institutions, and who has attended two or more patients in the hospitals within the twelve months preceding the election, is eligible to vote.

Prescribed registration forms are obtainable from the Medical Superintendents of the institutions mentioned, and medical practitioners desirous of being registered should forward such forms, countersigned by the Medical Superintendent, to the *Chairman of the Hospital Board concerned*, P.O. Box 1487, Cape Town, not later than noon, on 31 December 1951.

The following are the Hospital Boards dealing with the abovementioned institutions:—

Teaching Hospitals Board (Cape Town): Groote Schuur Hospital; Peninsula Maternity Hospital; Mowbray Maternity Hospital.

Somerset Hospital Board: Somerset Hospital.

Southern Suburbs Hospitals Board: Woodstock Hospital; Rondebosch and Mowbray Hospital; Victoria Hospital, Wynberg; Lady Michaelis Orthopaedic Home; Princess Alice Home of Recovery; Cape Town Free Dispensary.

False Bay Hospital Board: False Bay Hospital.

Northern Areas Hospital Board: Conradie Home.

L. Welham
Branch Representative

58 Loop Street
Cape Town (12195)

Afdelingsraad van Montagu

DEELTYDSE GENEESKUNDIGE GESONDHEIDS-BEAMPTE

Aansoeke word ingewag om die betrekking van deeltydse Geneeskundige Gesondheidsbeampte teen 'n allesinsluitende salaris van £120 per jaar.

Applikante moet volledige besonderhede van kwalifikasies meld. Dienste moet op 1 Januarie 1952 aanvaar word.

Afskrifte van die Memorandum van Ooreenkoms betreffende die pligte en voorwaardes van aanstelling kan van die ondergetekende verkry word.

Aansoeke in verseelde koeverte gemerk 'Gesondheidsbeampte' moet die ondergetekende nie later dan Saterdag 24 November 1951 bereik nie.

Stemwerwing by raadslede sal 'n diskwalifikasie wees.

Afdelingsraadkantoor
Posbus 36
Montagu
12 Oktober 1951

J. P. le Grange
Sekretaris

Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT

1. Applications are invited from medical graduates for appointment to the posts of Junior Resident Medical Officer (Intern) at the undermentioned institutions:—

Groote Schuur Hospital: To the following departments: Ear, Nose and Throat; Ophthalmic; Orthopaedic; Dermatology; Radiology; Neurology; Psychiatry and Neuro-surgery; Urology; Plastic Surgery; Obstetrics; Gynaecology; Paediatrics; Medical; Surgical and relieving duties.

Somerset Hospital, Beach Road, Green Point.

False Bay Hospital, Simonstown.

Rondebosch and Mowbray Hospital, Camp Ground Road, Rosebank.

Victoria Hospital, Wynberg.

Woodstock Hospital, Mountain Road, Woodstock.

Mowbray Maternity Hospital, Durban Road, Mowbray.

Peninsula Maternity Hospital, Caledon Street, Cape Town.

Somerset Hospital (Maternity Section), Beach Road, Green Point.

2. The salaries attaching to the posts are £240 per annum plus board, quarters and laundry.

3. In addition to the salaries and allowances stated above a temporary non-pensionable cost-of-living allowance is payable at the rates and on the conditions that may be prescribed by the Administrator from time to time.

4. Applications containing particulars of experience, qualifications, etc., should be forwarded to reach the Medical Superintendent of the institution concerned not later than noon, on 1 December 1951.

5. Applications for the posts in the maternity hospitals, viz. Mowbray Maternity Hospital, Peninsula Maternity Hospital and Somerset Hospital (Maternity Section) should be forwarded to the Medical Superintendent, Peninsula Maternity Hospital.

6. Applicants applying for more than one post should submit separate applications and copies of testimonials for each post applied for.

7. Candidates sitting for the final M.B., Ch.B. examination can submit their applications prior to the results of the examination being known.

8. Successful applicants will be required to enter into contracts with the Provincial Administration with effect from 16 January 1952, and must be registered with the South African Medical Council before they will be allowed to assume duty.

9. No canvassing is permitted.

10. The appointments are governed by Ordinance No. 19 of 1941, as amended from time to time and by the regulations framed thereunder.

11. Application must be made on the prescribed form (Staff 23) which is obtainable from the Director of Hospital Services, P.O. Box 2060, Provincial Building, Wale Street, Cape Town, or from the Branch Representatives of the Hospitals Department at Cape Town (P.O. Box 1487), Port Elizabeth (P.O. Box 80), East London (P.O. Box 13), Kimberley (P.O. Box 618) and Umtata (P.O. Box 202), or from the Medical Superintendent of any Provincial Hospital or Secretary of any School Board in the Cape Province.

(Y 267917)

Wanted

Assistant male, for practice in southern suburbs Cape Town. Part-time assistant would be considered. Write to 'A. J. C.', P.O. Box 643, Cape Town.

Medical Practice for Sale

Orange Free State. Oldest practice in Free State's most pleasant town (Eastern). Hospital. Good native income. Reason for selling, retirement. £500. Reply to 'A. I. K.', P.O. Box 643, Cape Town.

Provinsiale Administrasie van die Kaap die Goeie Hoop

HOSPITAALDEPARTEMENT

1. Aansoeke word ingewag van Mediese Gegradueerdes vir aanstelling in die betrekkings van Junior Inwonende Mediese Beampte (Intern) aan die ondergemelde inrigtings:

Groote Schuur-hospitaal vir die volgende afdelings: Oor, Neus en Keel; Oog; Ortopediese; Dermatologiese; Radiologiese; Neurologiese; Psigiatrie en Neurochirurgie; Urologiese; Plastiese-snykunde; Verloskunde; Vrouesiektes; Pediatriese; Mediese; Snykunde en Aflosdienste.

Somerset-hospitaal, Kusweg, Groenpunt.

Valsbaai-hospitaal, Simonstad.

Rondebosch en Mowbray-hospitaal, Campgroundweg, Rosebank.

Victoria-hospitaal, Wynberg.

Woodstock-hospitaal, Mountainweg, Woodstock.

Mowbray-kraaminrigting, Durbanweg, Mowbray.

Skiereilandse Kraaminrigting, Caledonstraat, Kaapstad.

Somerset-hospitaal (Kraamafdeling), Kusweg, Groenpunt.

2. Die salarisse verbonde aan die poste is £240 per jaar plus losies, inwoning en wasgoed.

3. Benewens die bovermelde salarisse en toelaes is daar 'n tydelike nie-pensioengewende duurtetoeslag betaalbaar volgens die skaal en voorwaardes wat deur die Administrateur van tyd tot tyd voorgeskryf word.

4. Aansoeke met volledige besonderhede van ondervinding, kwalifikasies, ens., moet gerig word aan die Mediese Superintendent van die betrokke inrigting en hom nie later as twaalfuur middag op 1 Desember 1951 bereik nie.

5. Aansoeke om die betrekkings in die kraaminrigtings, d.w.s. Mowbray-kraaminrigting, Skiereilandse Kraaminrigting en Somerset-hospitaal (Kraamafdeling), moet gestuur word aan die Mediese Superintendent, Skiereilandse Kraaminrigting.

6. Kandidate wat om meer as een betrekking aansoek doen moet afsonderlike aansoeke en afskrifte van getuigskrifte voorlê vir elke betrekking waarom aansoek gedoen word.

7. Kandidate wat die finale M.B., Ch.B.-eksamen skryf, kan hul aansoeke instuur voordat die uitslag van die eksamen bekend is.

8. Van die geslaagde kandidate word vereis om 'n kontrak met die Provinsiale Administrasie met ingang van 16 Januarie 1952 aan te gaan en hulle moet geregistreer wees by die Suid-Afrikaanse Mediese Raad voordat hulle toegelaat sal word om diens te aanvaar.

9. Geen stemmewerwing word toegelaat nie.

10. Die aanstellings is ooreenkomstig Ordonnansie nr. 19 van 1941, soos van tyd tot tyd gewysig, en die regulasies wat daarkragtens opgestel is.

11. Aansoek moet gedoen word op die voorgeskrewe vorm (Staf 23) wat verkrygbaar is by die Direkteur van Hospitaaldienste, Posbus 2060, Provinsiale Gebou, Waalstraat, Kaapstad, of by die Takverteenwoordigers van die Hospitaaldepartement te Kaapstad (Posbus 1487), Port Elizabeth (Posbus 80), Oos-Londen (Posbus 13), Kimberley (Posbus 618) en Umtata (Posbus 202) of by die Mediese Superintendent van enige provinsiale hospitaal of by die Sekretaris van enige Skoolraad in die Kaapprovinsie.

Y 267917

Part-Time Medical Officer

RUSTENBURG PLATINUM MINES MEDICAL BENEFIT SOCIETY

Applications are invited for fully qualified registered general practitioners in respect of the above appointment.

Applications must reach the Secretary of the Society, P.O. Box 143, Rustenburg, by Friday, 23 November 1951.

Further particulars can be obtained from the Secretary.

Natal Provincial Administration

VACANCIES FOR SENIOR MEDICAL OFFICERS

Applications are invited from registered medical practitioners for the following vacancies in the Natal Provincial Administration:—

King Edward VIII Hospital, Durban
Casualty department,
Out-patients department,
Department of obstetrics and gynaecology,
Department of ear, nose, throat and eye.

Wentworth Hospital, Durban
Fever, chest and venereal diseases.

Grey's Hospital, Pietermaritzburg
General duties (two posts),
Medical out-patients department.

Addington Hospital, Durban
Department of medicine,
Department of obstetrics and gynaecology,
Department of anaesthetics,
Department of surgery,
Casualty and out-patient department (Coloured).

Stanger Hospital
General duties.

Port Shepstone Hospital
General duties.

Appointment is on twelve months' contract and the salary attaching to the post is as follows:—

Two years' service after qualification—£400 p.a. plus privileges.

Three years' service after qualification—£600 p.a. plus free quarters or an allowance in lieu thereof.

Four years' service after qualification—£700 p.a. plus free quarters or an allowance in lieu thereof.

Five years' service or more after qualification—£800 p.a. plus free quarters or an allowance in lieu thereof.

Applications giving full details of experience and qualifications should be addressed to the Director of Provincial Medical and Health Services, P.O. Box 20, Pietermaritzburg, to reach him by 24 November 1951. (A.D.6592)

The South African Medical and Dental Council

Applications are invited for the post of Part-time Inspector of Internships for a period of one year at a salary of £1,000 which includes cost-of-living allowance.

Applicants must be registered by the Council as medical practitioners and must be bilinguals. The appointment will be made from year to year.

The successful applicant will be required to visit hospitals in South Africa and undertake the general supervision of the work of interns, and he may be required to perform such other duties of an educational nature as may be assigned to him by the Council. He will be required to give an equivalent of approximately six months' service full-time during the 12 months of his appointment. He need not necessarily be resident in Pretoria, but he must be prepared to attend in the offices of the Council whenever his duties require it. Further details of the duties required of the inspector may be obtained from the undersigned on application.

Travelling expenses and subsistence allowances will be paid in accordance with the regulations of the Council.

Applicants will be required to assume duties as early as possible in the year 1952.

Applications in writing, stating age, qualifications, experience, etc., and accompanied by a certificate of good health and copies of recent testimonials, must reach the undersigned not later than 30 November 1951.

Wm. Impey
Registrar
S.A. Medical and Dental Council

P.O. Box 205
Pretoria
30 October 1951

Natalse Provinsiale Administrasie

VAKATURES VIR SENIOR MEDIESE BEAMPTES

Aansoeke om aanstelling in ondervermelde betrekkings by die Natalse Provinsiale Administrasie word van geregistreerde mediese praktisyns ingewag:

Koning Edward VIII-hospitaal, Durban
Ongevalle-afdeling.
Afdeling vir buitepasiënte.
Afdeling vir vrouesiektes en verloskunde.
Afdeling vir oor, neus, keel en oog.

Wentworth-hospitaal, Durban
Koors, bors en geslagsiektes.

Greyshospitaal, Pietermaritzburg
Algemene pligte.
Mediese afdeling vir buitepasiënte.

Addingtonhospitaal, Durban
Afdeling vir medisyne.
Afdeling vir vrouesiektes en verloskunde.
Afdeling vir narkose.
Afdeling vir snykunde.
Afdeling vir ongevalle en buitepasiënte (kleurlinge).

Stanger-hospitaal
Algemene pligte.

Port Shepstone-hospitaal
Algemene pligte.

Aanstelling geskied op kontrak vir twaalf maande en die salaris is as volg:—

Twee jaar diens na afstudering: £400 per jaar, plus voorregte.

Drie jaar diens na afstudering: £600 per jaar, plus gratis kwartiere of 'n toelae in plaas daarvan.

Vier jaar diens na afstudering: £700 per jaar, plus gratis kwartiere of 'n toelae in plaas daarvan.

Vyf jaar of meer diens na afstudering: £800 per jaar, plus gratis kwartiere of 'n toelae in plaas daarvan.

Aansoeke met volledige besonderhede betreffende ervaring en kwalifikasies moet gerig word aan die Direkteur van Provinsiale Mediese en Gesondheidsdienste, Posbus 20, Pietermaritzburg, sodat hulle hom teen 24 November 1951 bereik. (AD 6592)

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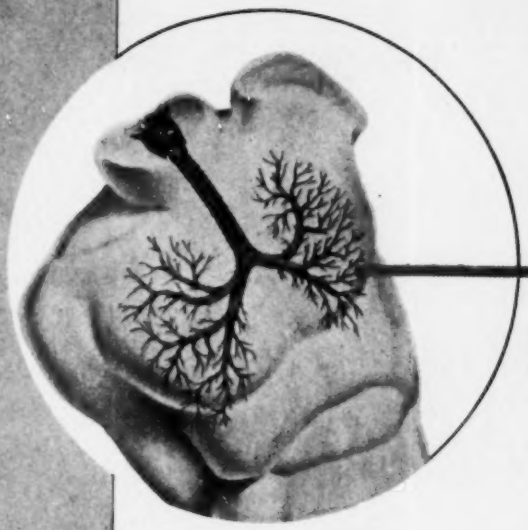

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